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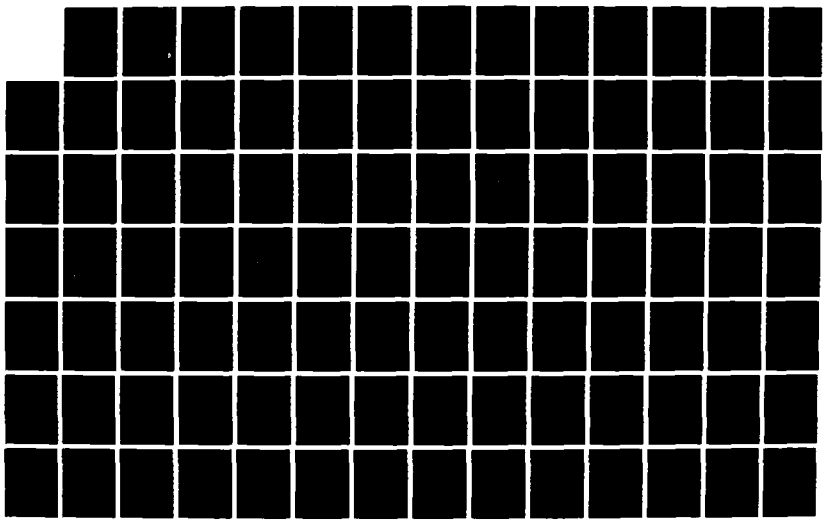

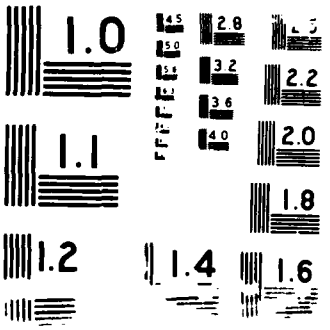
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Developing a Theory for Dynamic Campaign Planning

by

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Infantry

School of Advanced Military Studies
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Fort Leavenworth, Kansas

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This is a theoretical paper on campaign planning. The paper examines the processes and principles involved in campaign plan formulation and modification within the context of all three levels of war. A series of theoretical models are used to describe the nature of war, the development and role of doctrine, and the ends, ways and means of war at the strategic, operational and tactical levels. The paradigms postulated describe war and operational concepts based primarily on an analogy using the physical concepts of energy and power. The proposed analogy differs somewhat from the Clausewitzian-Newtonian model which was based upon force and mass. The postulated models discriminate between the three levels of war and portray the role and influence that commanders at each level have on battle outcome.
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The paper uses past and present theorists to develop the theoretical framework used in the analyses. When appropriate, various historical examples are woven into the discussion to illustrate specific concepts or phenomenon. Appendices are used to further elaborate on conceptual models and to provide more detailed historical illustrations of the concepts being examined.

The paper develops paradigms defining the nature of war and the spectrum of conflict (low-medium-high intensity warfare). The role of doctrine is examined at all levels of war and levels of conflict together with an analysis of the dynamic nature of doctrine development and fielding. The means, ways and ends of war are examined at each level of war. Specific relationships are developed relating attrition to force ratios and the form of war (offense or defense) employed. The critical role of strategic guidance and the practice of strategic art is also analyzed with its relationship to the operational level of war.

The majority of the paper focuses on the operational level of war and related concepts. The concepts of center of gravity, decisive points, selection of objectives, battlefield geometry and offensive and defensive culminating points are all discussed and defined. The Normandy Operation is described in detail in an appendix and is used to further illustrate the concepts of centers of gravity and decisive points as they pertain to a phased operation covering air, land and sea. The monograph ends with a detailed analysis of the role of initiative as a focus for operational planning. The paper concludes with the finding that gaining and retaining the operational initiative is the quintessence of campaigning and the practice of operational art.

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ABSTRACT

DEVELOPING A THEORY FOR DYNAMIC CAMPAIGN PLANNING. by Major Edward J. Filiberti, USA, 78 pages.

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I. INTRODUCTION

A campaign is the operational way that the commander of a theater of war or theater of operations coordinates, employs and sustains over time his available resources in a series of joint actions across an expanse of air, land, and sea in order to achieve strategic objectives. It is a phased series of major operations along the intended line (or lines) of operation to bring about decisive results from battles. The synergistic effect of these phased joint operations creates the operational advantage, or leverage, which makes the enemy's position untenable.[1]

Since the operational level of war was formally introduced to the U.S. Army in the 1982 FM 100-5, there has been increasing attention given to the role of the campaign plan in the prosecution of war. Generally, the division of war into three separate levels has resulted in both confusion and controversy. This is due, in part, to an absence of an overall theoretical construct defining the three levels of war and a lack of understanding of the conceptual terms that pertain to each level. The campaign plan has been the focus of much of this confusion as commanders in the field struggle to develop operational plans fulfilling its perceived role.[2] Although some research has been conducted on the initial formulation of campaign plans, very little literature exists on the modification of campaign plans once operations commence. It is the goal of this monograph to expand upon the theoretical treatment of the operational level of war with the focus towards the dynamic aspects of campaign planning. The intent is to develop an overall theoretical construct that discriminates the differences between the three levels of war and also facilitates the analyses of historical campaigns.

THE PURSUIT OF WISDOM AND ART

Hermann Hesse, in his novel Siddhartha, develops a situation

analogous to the search for a prescriptive doctrine to guide the operational commander. Upon completion of his epic journey in search of salvation and nirvana, Govinda encounters Siddhartha who has become a ferryman on a river. Discovering that Siddhartha has achieved salvation, Govinda asks Siddhartha for the path. Siddhartha responds that salvation cannot be learned, it must be experienced. "Knowledge can be communicated, but not wisdom. One can find it, live it, be fortified by it, do wonders through it, but one cannot communicate and teach it." [3]

Likewise, the practice of operational art is not subject to the rigors of rote education or scientific application. The design and conduct of campaigns is termed operational art because it is overwhelmingly influenced by the genius, imagination and judgement of those who practice it. Thus, any attempt to reduce its fundamental principles to a prescriptive doctrine will be prone to flaws and frustration as exceptions confute the rules. Yet for all the intangibles that make each campaign unique, there exists an opportunity to develop a series of rules and principles relating to the practice of operational art. The intent is to develop a framework to "educate the mind of the future commander, or, more accurately, to guide him in his self education, not to accompany him to the battlefield."[4]

Theory can then serve as an aid for study and analysis from which the student can expand his experience base. Thus, exceptions to developed principles and rules enlighten the student as much as does conformity. In war, the rule does not preclude the exception. Conversely, in study, the exception does not divest the rule. For it is the enlightenment that comes from

understanding and experience that hones the mind and serves to convert knowledge into wisdom and technique into art.

AN ANALYTICAL APPROACH

The operational level of war lies between and links the strategic and tactical levels. Thus, it is profoundly affected by the varied and diverse factors attendant at every level. The theoretical model for the operational level of war must therefore consider numerous principles. These principles range from the causes and desired ends of conflict at the strategic level to the employment of forces to achieve the strategic ends at the tactical level. This monograph will develop a theoretical framework for modeling the nature of war that subsumes these diverse factors. It will use both past and present military theorists to derive the principles that influence the three levels of war.

The proposed analytical paradigms will depart from the Newtonian analogies used by Clausewitz.[5] Instead, the theoretical arguments will draw upon the physical relationships comparable to modern electro-magnetic theory and Relativity.[6] The concept of *energy* is central to the postulated theoretical analogies. Thus, *war energy* will form the basis of the theoretical paradigms used to describe war.

The analysis will start with a description of the dynamic causes and nature of war. The key role that doctrine formulation and fielding has on the preparation and conduct of war will then be highlighted. Next, I will develop a theoretical construct describing the three levels of war that considers the ways, ends and means associated with each level. Finally, I will examine

the critical role that gaining and retaining the operational initiative has on the practice of operational art and successful campaigning.

II. THE NATURE OF WAR

[war can be considered as]...organized violence carried on by social groups with conflicting interests; as a form of struggle in the whole process of resolving social conflict; and as a continuation of and instrument of policy.[1]

INTRODUCTION

A description of the nature of war begins with the conflict between two competing groups. This conflict consists of the dialectic of the groups two opposing wills using available means to resolve their disputes. This study focuses on conflict between nation-states. Although conflict can occur within nation-states between social groups and even between social groups in separate nations, the reader will have to extrapolate the relevant theoretical principles to these entities.[2]

WHAT CAUSES CONFLICT?

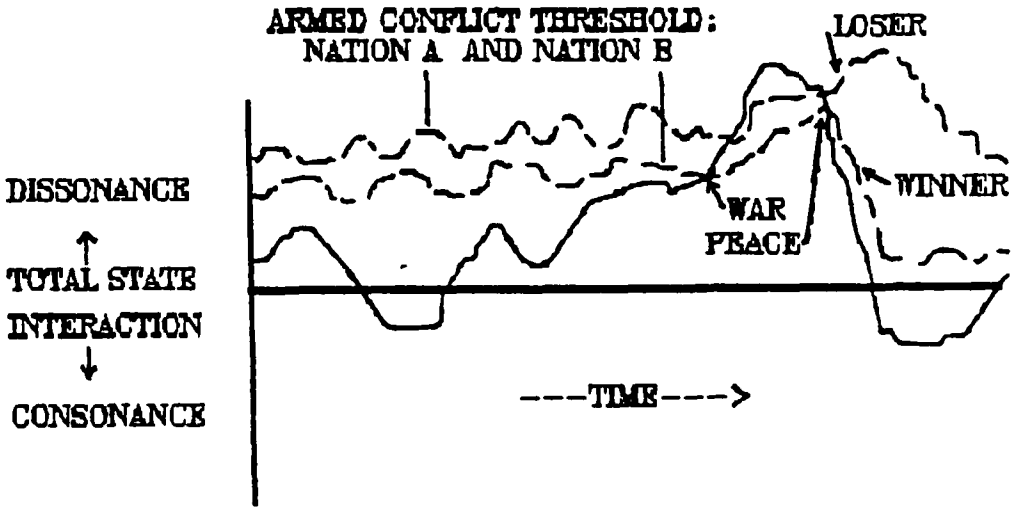
Conflict between nations may occur in the social arena where differing cultures, competing ideology, and religious interests collide. Economically, conflict exists between all nation-states where the nations' industries compete with one another for natural resources and the sale and purchase of manufactured goods. No perfect symbiotic relationships are known to exist between two nations in exports and imports. Thus, economic conflict between nation-states is commonplace.

Political and military conflict exists as a corollary to social and economic conflict. nation-states continuously engage in diplomatic maneuvering for influence in the international

arena. Superpowers usually conduct these activities in third world countries which are critical geo-political influences in their respective areas. Additionally, nation-states develop military capability to use directly or for deterrence in pursuit of their interests. Thereby, nations direct political and military efforts in the social-economic arenas to achieve desired policy objectives. Between two nation-states, all of these factors combine in a dynamic system which varies the relations between the nations from consonance to dissonance and in the degree of consonance and disonnance. As time passes, nation states interact and continuously progress through conflict and conflict resolution, and from alliances to opposition coalitions.(See Figure 2-1.)

Armed conflict arises when competition in one or more of these areas exceed an acceptable threshold of a nation-state. This threshold varies from state to state and even within one state over time. The threshold level may be sensitive to national leadership, ideological movements, and international influences as well as many other internal and external factors. Once armed conflict occurs, what the nation's policy establishes as the ends should be met through a logical application of means. "Strategy depends for success, first and most, on a sound calculation and coordination of the ends and the means."[3] Depending upon the nature of the policy objectives, appropriate strategy is devised employing social-political, economic-geographic, and military elements of power while being propelled by the wills of the people, government and military towards desired ends.[4] Appendix A, further describes the model

FIGURE 2-1: NATION-STATE MODEL OF CONFLICT



depicted in Figure 2-1 with an explanation of the dynamic interaction between the nations degree of conflict and corresponding thresholds.

III. ROLE OF DOCTRINE IN THE CONDUCT OF WAR

Military doctrine includes the preferred mode of a group of services, a single service, or a subservice for fighting wars. It reflects the judgements of professional military officers, and to a lesser but important extent civilian leaders, about what is and is not militarily possible and necessary. Such judgements are based on appraisals of military technology, national geography, adversary capabilities, and the skills of one's own military organization.[1]

INTRODUCTION

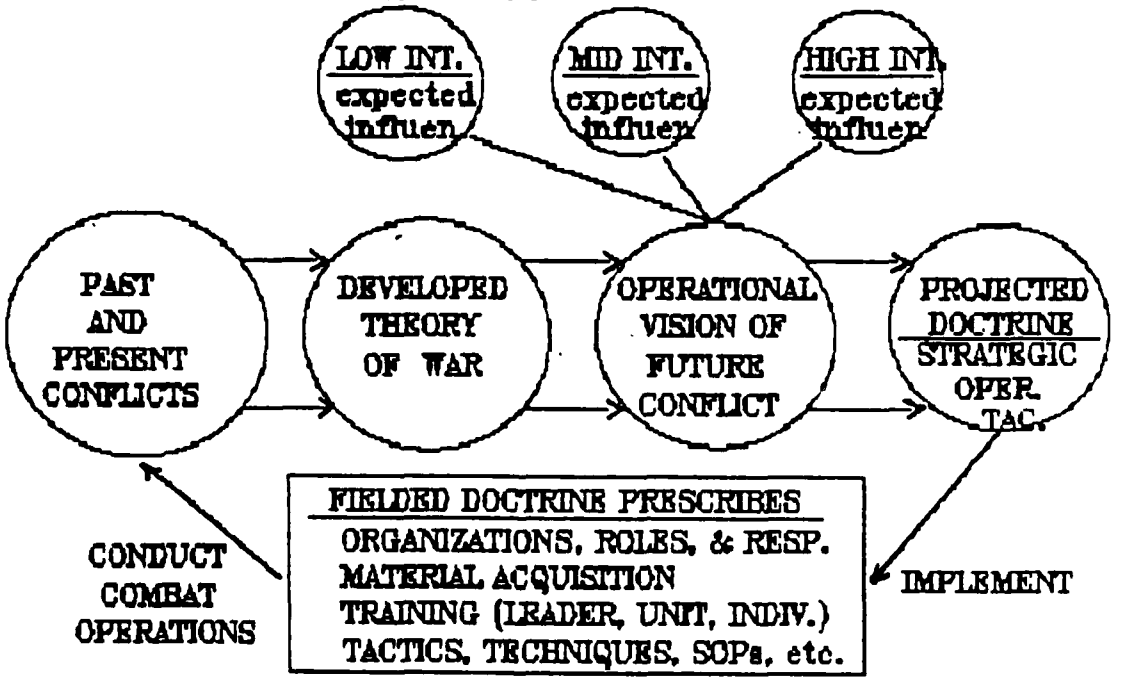
Central to the preparation of war is the development of doctrine. Doctrine establishes the preferred methods which, in turn, should prescribe the ends, ways and means at the strategic, operational and tactical levels of war. Therefore, the development of doctrine is key to both the preparation and conduct of war.

AN OVERVIEW OF DOCTRINE FORMULATION

Effective doctrine is a product of logical deductive analyses which reasons from a theory of war through an extrapolation of the nature of modern war to an optimal doctrine expected to succeed in that war. The theory of war is derived from historical studies and analyses of cause and effect relationships of past and present conflicts. Based upon relevant theories and numerous internal and external influences, an operational vision of future war is postulated. The operational vision leads to the formulation of doctrinal concepts which are implemented in preparation for conflict (See Figure 3-1).

Doctrine specifies the optimal method for the conduct war. At the national level it guides planning, programming and budgeting

FIGURE 3–1: DOCTRINE DERIVATION.



and prescribes the intended response of governmental agencies and departments employing available elements of power. Within the military, it dictates force design, materiel acquisition, professional education, and individual and unit training. In summary, it is the foundation on which the national agencies and the military are built.

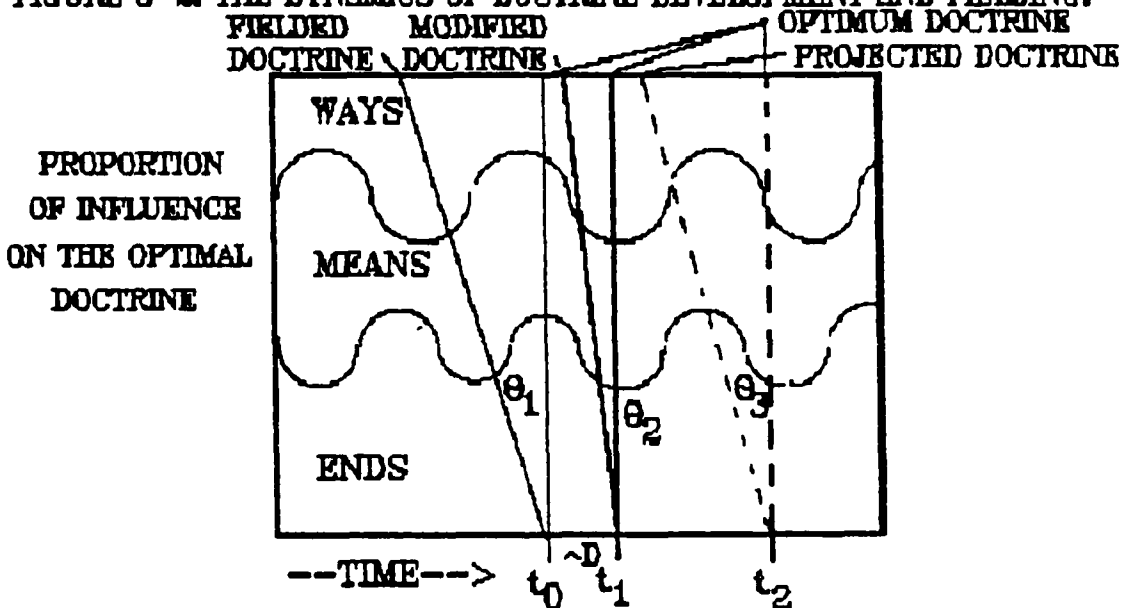
The development of doctrine, the relationship between doctrine and the conduct of war, and the inter-relationship of doctrine at all levels of war and levels of conflict are the subjects of much debate and analyses. Appendix B, provides a brief theoretical discussion of the formulation and application of doctrine. The Appendix develops a theoretical model by which the levels of conflict can be discerned and establishes the relationship between doctrine at each of the levels of war.

Doctrine development *and* modification are keys to the preparation and conduct of war at all levels of war and levels of intensity. The remaining analysis will develop a theoretical model that reflects the dynamic formulation of doctrine and the influence of its accuracy on the conduct of war.

THE DYNAMICS OF DOCTRINE DEVELOPMENT

Figure 3-2 models the process of the dynamic development, fielding and adjustment of doctrine. The paradigm takes into consideration the major battlefield influences on effective doctrine and the difficulties in forecasting their affect. The Y-Axis reflects the proportion of influence that the ways, means and ends have on the optimal doctrine. At the operational level, the ways may include tactics, techniques, and procedures of operation. The means may include the military organizations and

FIGURE 3–2: THE DYNAMICS OF DOCTRINE DEVELOPMENT AND FIELDING.



~D = DIFFERENCE DUE TO TIME LAG BETWEEN OPTIMUM AND FIELDED DOCTRINE.

θ_n =ERROR IN PROJECTING OPTIMUM DOCTINE.

equipment which, in turn, are influenced by technological advancements. The ends range from negative aims to positive aims. These aims vary from deterrence, defense or denial of enemy aims to offensive ends focused on territorial gains, gaining political hegemony, etc..

Figure 3-2 reflects the relationship between the accuracy of doctrine and the dynamics of its implementation. As the figure reflects, the ends, ways and means are in a constant state of change as to their influence on the optimum doctrine. A vertical line intersecting the X-Axis at any point represents the optimal doctrine at any time "t_n". The angle theta (θ), represents the error between promulgated doctrine and the optimum doctrine at any time t_n. There is always a time lag between what is fielded and what is projected. At any point in time, the nation is operating within the doctrine that it has fielded while simultaneously developing doctrine for some future predicted operational environment. Within certain organizational constraints, fielded doctrine also adapts as executing agencies adjust to the actual operational environment while conducting exercises or war. Consequently the angle theta usually varies over time as well. Thus, there exist three thetas at any one time: θ_1 reflects the error between the initial fielded and optimum doctrine at time "t_0"; θ_2 is the error between the current modified fielded doctrine and the optimum doctrine at time "t_1"; and θ_3 is the error in the projected doctrine and the future optimum doctrine at time "t_2". Additionally there is also an error ^D that is a result of the time delay inherent in fielding doctrine. In the above model, the angle θ_2 includes the

error ^D.

The purpose of this model is to highlight the operational problems facing commanders at all levels. The commander must be keenly aware of the conditions and assumptions that form the basis of his doctrine. He must realize that there will always be a difference in doctrine between what was and what should have been; between what is and what should be; and between what will be and what should be. Thus, an initial and on-going task of commanders at all levels is to assess the operational environment continuously and determine the appropriate doctrinal modifications that will improve the effectiveness of their forces.

These activities are never done in isolation. The enemy's fielded, practiced and projected doctrine provides a constant backdrop to this process and is a major factor in discerning critical changes in the operational environment.

There are numerous historical examples where a nation or army has had to modify its doctrine to adapt to the unexpected demands of the operational environment. Germany's adoption of Hutier tactics towards the end of WWI is one example. A recent example is the Israeli adjustment of their tactics for employing armored forces based upon the effectiveness of Anti-tank Guided Missiles (ATGM) during the 1973 Arab-Israeli War. In both instances, the leaders in charge critically assessed the reasons for success and failure and actively modified existing doctrine to improve combat performance.

The suitability of the currently fielded doctrine together with the government's, and military's ability to modify incorrect

doctrine once war commences, is critical to the conduct of war. Correct doctrine influences the efficiency with which combat potential is applied and is a key variable in developing a combat power model for the three levels of war.

IV. THE MEANS, WAYS AND ENDS OF WAR

War has three general levels of effort--policy and strategic direction at the seat of government, campaign planning and execution in the theater of war and tactical activities on the battlefield. Strategy directs the overall war effort, campaigning is the employment of military forces in the theater of war to attain strategic goals and tactics consist of actually fighting battles...At each of these levels, military commanders must concern themselves with three things: what they are to do--the ends; how they are to do it--the ways; and with what they have to do it--the means.[1]

INTRODUCTION

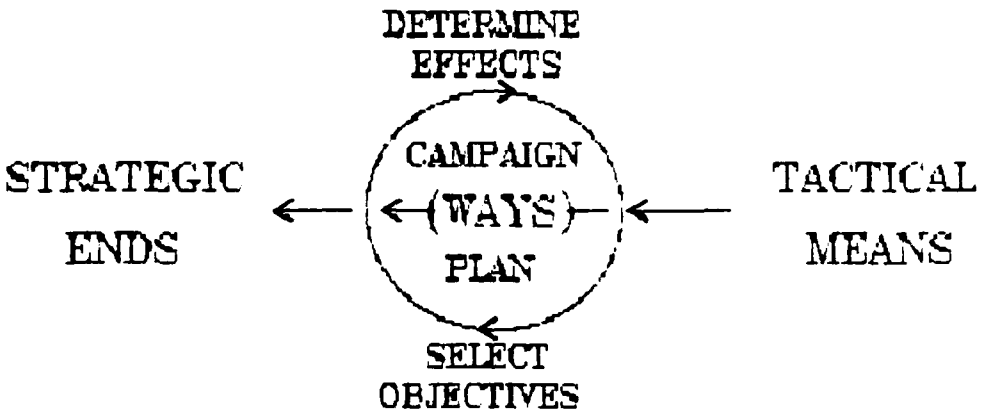
The ends, ways and means of war provide the construct for developing the theoretical basis for campaign planning. At the strategic level, the campaign plan in a theater of operations constitutes the *way* in which the military intends to accomplish the strategic *ends* given the available tactical resources as the means. The operational commander must determine the military effect that he must produce against the enemy forces that will lead to the strategic ends. This is the military strategy that takes into consideration the available means and the feasible objectives that will achieve those effects.(See Figure 4-1.)[2]

COMPARING THE MEANS

Military activity is never directed against material force alone; it is always aimed simultaneously at the moral forces which give it life, and the two cannot be separated.[3]

The development of war plans must include a comparative assessment of the means available. An analysis of the opposing forces combat capability is key to this assessment. An accurate

FIGURE 4–1: THE PROCESS OF OPERATIONAL CAMPAIGN PLANNING.[2]



analysis requires the consideration of both the physical and moral strengths of the opposing forces. These two aspects of combat power also influence the analysis of feasible political ends which, in turn, dictate the design of the subsequent campaign plan (the ways).

QUANTIFICATION AND/OR JUDGEMENT

The comparative assessment of relative combat power is a complex and difficult undertaking. It requires both a quantitative and qualitative judgement of existing capability and potential. Several methodologies exist which attempt to codify the procedures for this analysis. The first, and most widely used, is presented in CGSC Student Text (ST) 100-9, The Command Estimate. The second is the methodology proposed by Colonel Wass de Czege in his unpublished paper, "Understanding and Developing Combat Power." The final, and most complex, is the process developed by Colonel T. N. Dupuy and described in his article "Let's Get Serious about Combat Multipliers" and in his book Numbers, Predictions & War. Each of these methodologies differ in its treatment of the moral and physical attributes of the opposing forces, yet all can be used to help understand the complexities of comparative force analysis and to arrive at a representative model for campaign planning. Appendix C, summarizes each of these approaches together with their treatment of the moral and physical aspects of war.

A MODIFIED APPROACH

The major flaw in applying existing force comparison models is that they fail to discriminate between the three levels of war. The models confound and convolute the multi-dimensional

factors at all levels of war. Generally, the models: combine the moral and physical aspects of combat power (if they treat them at all); they blend the quality of strategic, operational and tactical concepts under leadership or tactics; they intertwine the accuracy of the doctrine at all levels; and even disassociate the concept of combat power with any level. Instead of assisting the operational commander, the models confront him with a maze of factors dealing mainly with micro-tactical aspects of war. Consequently, he is left without a clear understanding of the nature of combat power at his level or the influence of his actions in the application of that power.

The Soviets, however, take into consideration differing force comparisons for each level of war. They estimate that the comparative force advantage required to succeed in the offensive is reduced as you go from the tactical, to the operational, and finally to the strategic levels of war.[4] Thus, the selection of operational defense, operational offense, lines of communication, lines of support, centers of gravity, and decisive points at the operational level are based upon comparative combat strengths and concepts that vary from the tactical level.

If a theoretical model is to have any utility to the operational practitioner, it must discriminate between the three levels of war, highlight the inter-relationships between the factors influencing these levels, and clearly define those aspects that he can and should influence. In this regard, the relationship between moral and physical aspects of combat power taken together with the hierarchical and dependent relationships of tactical, operational and strategic levels of power will be

the basis for developing a model for the three levels of war.

WAR ENERGY AT THE DIFFERENT LEVELS OF WAR

The concept of *war energy* is the basis of the model for the three levels of war. Available war energy dictates the *potential* power that could be applied in war. War energy, at all levels, is a function of both the moral and physical factors of war. In this model, war energy is postulated to be the mathematical product of the physical and moral factors at each level. However, the comparative influence of the moral factors is postulated to have an exponential (squared) impact on war energy compared to the physical factors (See Figure 4-2).[5]

Figure 4-2 depicts the various components of war energy at each level of war. The moral component at each level has two parts. These two parts consist of: (1) the will of the faction that directs and supports the physical mass at that level; and (2) the will of those charged with executing the concept at that level. The physical components at each level reflect the primary sources of physical strength. Each level's physical component has three parts that vary with the level. Since war energy is a product of both the moral and physical component, if either the will or the mass is zero, total war energy becomes zero.

Since the elements of both the physical and moral factors are not independent, their effects are not simply additive as represented in the formulas in Figure 4-2. Instead, the total of both the physical and moral factors at each level would be minus the union of each of the pairs of elements and plus their total intersection, e.g., the shaded area in Figure 4-3.[6] This reflects the interdependency of each factor on each other. For instance,

FIGURE 4-2: FORMULA FOR WAR ENERGY.

$$\text{ENERGY} = \text{MASS} * (\text{WILL})^2$$

STRATEGIC LEVEL

MASS = MILITARY + ECONOMIC-GEOGRAPHIC + SOCIAL-POLITICAL

WILL = (WILL OF THE GOVERNMENT) + (WILL OF THE PEOPLE)

OPERATIONAL LEVEL

MASS = GROUND FORCES + NAVAL FORCES + AIR FORCES

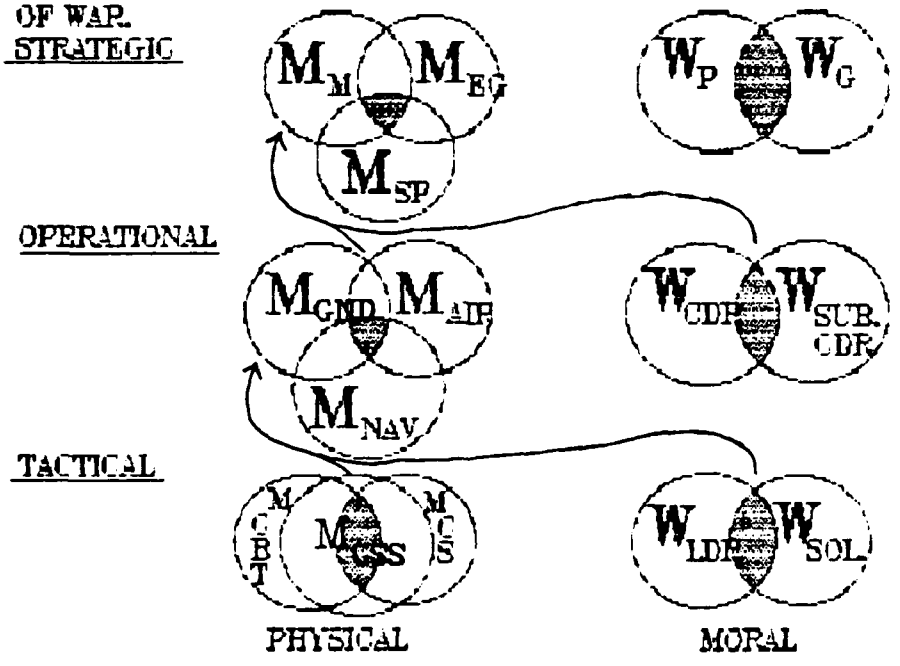
WILL = (WILL OF THE OPER. CDR) + (WILLS OF THE SUB. COMP. CDRS)

TACTICAL LEVEL

MASS = COMBAT + COMBAT SUPPORT + COMBAT SERVICE SUPPORT

WILL = (WILL OF THE LEADERS) + (WILL OF THE SOLDIERS)

FIGURE 4-3: COMPONENTS OF THE ELEMENTS OF ENERGY AT THE LEVELS OF WAR.



the air forces' effectiveness depends upon ground forces, to a certain extent, for security, intelligence, control etc.. Likewise, the morale and will of the operational commander influences, to a degree, the morale and will of his subordinate component commanders and vice versa.

The war energy at each level of war are also interrelated. Generally, the total energy at the one level is nested in the physical component of energy at the next higher level. For example: the combat, CS and CSS forces at the tactical level (both the physical and moral) becomes a part of the physical component of the ground forces' energy at the operational level. Similarly, the total of the ground, naval and air forces' energy at the operational level becomes one part of the nation's physical component of energy (the military) at the strategic level. The nested aspect of the model represents the critical interrelationship of both the physical and moral components of energy at all three levels. Each of the higher levels physical component of energy is dependent upon the lower. Also, a breakdown in the moral component at each level results in a chain reaction negating energy at that level *and* the higher levels.

Figure 4-3 depicts only one component of the next higher level in this hierarchical configuration. For instance, the physical and moral elements of energy of the government agencies charged with exercising the social and political elements of power also have elements of energy at their own operational level. Furthermore, each service and agency would also have tactical elements of energy each with their own respective physical and moral components. For simplicity, these are not

represented in Figure 4-3.

It is beyond the scope of this paper to develop a quantifiable model of combat power at all levels of war. However, the physical and moral factors at the tactical level may be equated to those developed by both Wass de Czege or Dupuy in their models. What is important for the reader to conceptualize is that each level of war contributes to the higher levels capability and at each level the will of those supporting and employing the combat power acutely influences the potential war energy. What is missing from this model is the effect of the application of this war potential against a dynamic opposing force.

CONVERTING ENERGY TO POWER

To convert energy into power you must apply it against some resistance. In the conduct of war at all levels, the resistance is a combination of friction and the forces of the enemy. The combat power generated depends upon both the magnitude of the resistance and the efficiency of its application. Within the proposed model, combat power equates to the product of *war energy* and a relative *efficiency factor* (See Figure 4-4).

The efficiency factor represented in the formula depicted in Figure 4-4 is the key variable that converts war energy into combat power. At each level of war, this factor is the quotient of the friendly and enemy forces efficiency coefficients. The efficiency coefficients at each level consist of three factors: (1) the accuracy of of the fielded doctrine (as previously developed in section III); (2) the quality of the concept of employment; and (3) the proficiency of execution. In the model,

FIGURE 4-4: CONVERTING WAR ENERGY INTO COMBAT POWER

COMBAT POWER = (EFFICIENCY FACTOR) * (ENERGY)

$$\text{EFFICIENCY FACTOR} = \frac{\text{EFFICIENCY COEFFICIENT (FRIENDLY)}}{\text{EFFICIENCY COEFFICIENT (ENEMY)}}$$

EFF. COEFF. = (ACCURACY OF DOCTRINE (0.0 --> 1.0)) * (QUALITY OF CONCEPT (0.0 --> 1.0)) * (PROFICIENCY OF EXECUTION (0.0 --> 1.0))

EFFICENCY COEFFICIENT FACTORS AND SUB-FACTORS AT THE THREE LEVELS OF WAR

> STRATEGIC LEVEL

* ACCURACY OF DOCTRINE; 1 - (sine O_2)

* QUALITY OF STRATEGIC CONCEPT
  - BALANCING OF TIME, WILL AND POWER WITH STRATEGIC ENDS
  - INTEGRATION OF ELEMENTS OF POWER TOWARDS WELL DEFINED GOALS
  - SELECTION OF SUITABLE STRATEGY AND FORM OF WAR
  - ALIGNMENT OF THEATERS OF OPERATION AND RESOURCES WITH C^2 CONCEPT
  - SPECIFICATION OF REALISTIC CONSTRAINTS AND RESTRAINTS
  - SEQUENCING OF CAMPAIGNS TO ACHIEVE STRATEGIC VICTORY

* PROFICIENCY OF EXECUTION
  - COORDINATION OF NATIONAL AGENCIES
  - SOLIDIFICATION AND SYNCHRONIZATION OF COALITIONS
  - DYNAMIC ADJUSTMENT OF STRATEGIC CONCEPT AND DOCTRINE
  - NATIONAL AND INTERNATIONAL EXERCISE OF LEADERSHIP

> OPERATIONAL LEVEL

* ACCURACY OF DOCTRINE; 1 - (sine O_2)

* QUALITY OF CAMPAIGN PLAN
  - VERITY OF INTELLIGENCE ESTIMATES
  - SUITABILITY OF LOGISTICAL SUPPORT CONCEPT
  - SELECTION OF OBJECTIVES
    - IDENTIFICATION OF ACTUAL CENTERS OF GRAVITY
    - DISCERNMENT OF DECISIVE POINTS
    - DETERMINATION OF VULNERABILITY AND EXPECTED EFFECTS
  - SELECTION OF LINES OF OPERATION, SUPPORT AND COMMUNICATIONS
  - PLANNING OF BRANCHES AND SEQUELS
  - REINFORCEMENT OF CONCEPT WITH DECEPTION PLAN

* PROFICIENCY OF EXECUTION
  - SEIZING OF INITIATIVE THROUGH ADJUSTMENT OF THE CAMPAIGN PLAN
  - INTEGRATION AND SYNCHRONIZATION OF OPERATIONAL-LEVEL ASSETS
    - OPERATIONAL INTELLIGENCE
    - OPERATIONAL FIRE SUPPORT
    - OPERATIONAL SUSTAINMENT
  - LEADERSHIP OF COMMANDER AND COMPONENT COMMANDERS
    - PRESCIENCE
    - IMPROVISITION, INITIATIVE AND AGGRESSIVENESS

FIGURE 4-4: (CONTINUED)

> TACTICAL LEVEL

* ACCURACY OF DOCTRINE; 1 - (sine O_2)

* QUALITY OF THE CONCEPT OF OPERATIONS
  - SELECTION OF OPTIMUM METHOD
  - SYNCHRONIZATION OF COMBINED ARMS
  - ACHIEVEMENT OF MAXIMUM SURPRISE
  - ALLOWS FOR AGILITY, FLEXIBILITY AND INITIATIVE
  - ANTICIPATION OF LIKELY CONTINGENCIES

* PROFICIENCY OF EXECUTION
  - GAINS AND RETAINS THE INITIATIVE
  - COMBINES THE ELEMENTS OF MANEUVER, FIREPOWER & PROTECTION
  - SYNCHRONIZATION OF COMBINED ARMS THROUGHOUT OPERATIONS
  - EXERCISE OF TACTICAL LEADERSHIP

the efficiency coefficient for each force is a product of these three factors.

The quality of the concept and the proficiency of execution also consist of multiple sub-factors which are unique to each level of war. The sub-factors listed in Figure 4-4 present the major influences that dictate the relative efficiency factors comprising each forces' efficiency coefficients. The sub-factors reflect those aspects not included in the moral and physical components of war energy and that depend upon an opposing force for a comparative measure of influence. Thus, *combat power* depends upon both the available or potential war energy and the comparative efficiency of its application. Since the efficiency factor is a ratio of fractions, the *comparative ways* that the *means* are employed can increase the overall value of the *means.*[7]

DEVELOPING THE WAYS THAT ACCOMPLISH THE ENDS

The entire conduct of war can be considered as the balancing of ends, ways and means. Each of the these elements are related. As previously illustrated, the ways in which the means are employed influences the value of the means. Similarly, the ends desired may constrain what can be employed as ways or even means. At each level of war, the ways, means and ends require constant appraisal and adjustment as the dynamics and results of combat modify the operational environment.

The ways selected at all levels of war hold a central position in the dynamics of conflict. Generally, the *ways* are the most transitory of elements and are the sole responsibility of the commander at each level. Although, combat power and outcome is dependent upon both planning and executing the

concept, this section will focus on the planning of the concept. The section examines the *ways* employed at each level of war and expands upon some of the factors concerning the quality of the concept highlighted in Figure 4-4. Since all three levels of war are related to each level's ways, means and ends, the analysis will integrate the discussion of all three levels while simultaneously focusing on the unique aspects of each.

THE STRATEGIC LEVEL

The development of the strategic concept entails the practice of strategic art. The strategist must make an assessment of the war energy of the opposing nations and develop a national strategy that employs national power against the opponent to achieve feasible strategic ends. In doing this, the strategist must balance the trilogy of *time*, *physical force* and *will* in determining both the strategic concept and ends.

The strategic concepts fall into two basic forms. Hans Delbruck classifies these forms as a strategy of annihilation and the strategy of exhaustion.[8] The strategy of annihilation has as its sole purpose the decisive battle by which the forces of the enemy can be quickly defeated and the will of the victor imposed upon the loser. Within this strategy, operational art is directed towards setting the conditions and employing the forces to create the climactic battle. The strategy of exhaustion, however, employs several equally effective means of attaining limited political ends by the exhaustion of the enemy usually over an extended period of time. Within this strategy, operational art is directed toward exploiting enemy weaknesses with a series of battles designed in conjunction with other

activities; diplomatic, economic, psychological, etc., to attain limited political ends. These limited ends are not expected to require the destruction of the enemy's armed forces. In following each of these strategies, the leader may select either offensive or defensive strategic approaches.

Within this general framework, the strategic planner must make some qualitative judgements. He must estimate the prevailing will of the nation. If the opposing forces cannot be overwhelmed in one climactic battle or through a *coup de main*, he must determine if the will of the people and government will sustain a protracted conflict pursuing a strategy *of* exhaustion. If not, he must determine how much force can be employed for what amount of time towards what political end. Simultaneously, he must examine the will of the opposing force and determine if the loss of their forces, either at once or over time, will necessarily result in the loss of their *will* to continue the war. Generally, the strategist can employ a small amount of force over a long time with a great amount of national will. He can employ a great amount of force over a short time with a small amount of will. Or, he can develop strategic concepts that may use a combination between these extremes. In any event, the quality of strategic guidance depends upon a reasonably accurate assessment of force, time and will and specifies ways, means and ends consistent with the assessment.

Within the strategic concept, the strategist must decide whether he will assume the strategic offensive or strategic defensive. The definition and distinction between both the strategic offensive and defensive is sometimes difficult to

determine. The conceptual definitions for both the defensive and offensive *forms of war* are fully developed in Appendix D for the strategic, operational and tactical levels. These definitions conceptually depict the posture of two competing forces and are the basis for computing likely attrition based upon the ways the opposing forces are employed.

HOW MUCH IS ENOUGH?

The theoretical model presented earlier develops combat power values based upon the physical and moral components of energy of the opposing sides and the comparative efficiency in applying that energy. The decision to assume the strategic offensive or defensive is dependent, to a degree, upon this analysis. Given, that the defense is the stronger form of war, there should be general norms that commanders can use to assist in the selection of offensive or defensive operations and the assessment of likely results.*

Figures 4-5 thru 4-7 are proposed graphs that can guide commanders in selecting either offensive or defensive forms of operations and assist in developing adequate ways to achieve desired ends. The figures depict the comparative force ratios (ratio of the combat power of each side) along the X-axis with the corresponding attrition (decrease in combat power) expected along the Y-axis. The two curves within the figures represent the *form of war* employed by each opposing side. Figures 4-5 through 4-7 represent the strategic, operational and tactical levels of war respectively. The curves reflect "attrition" in both the physical and moral domains of war. Although the specific percentages are not depicted in the graphs, the degree

FIGURE 4-5: ATTRITION AS A FUNCTION OF FORCE RATIO (POSTULATED) FOR THE STRATEGIC LEVEL OF WAR.

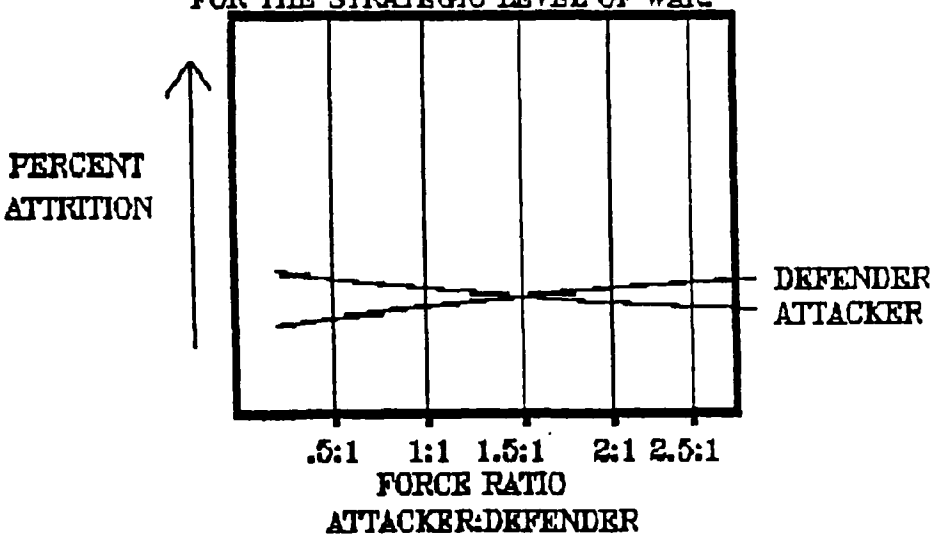


FIGURE 4-6: ATTRITION AS A FUNCTION OF FORCE RATIO (POSTULATED) FOR THE OPERATIONAL LEVEL OF WAR.

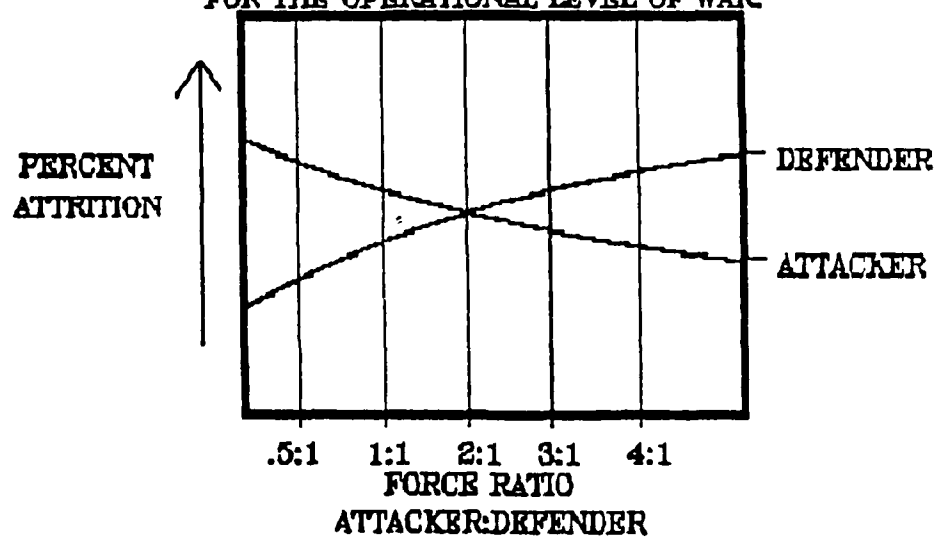
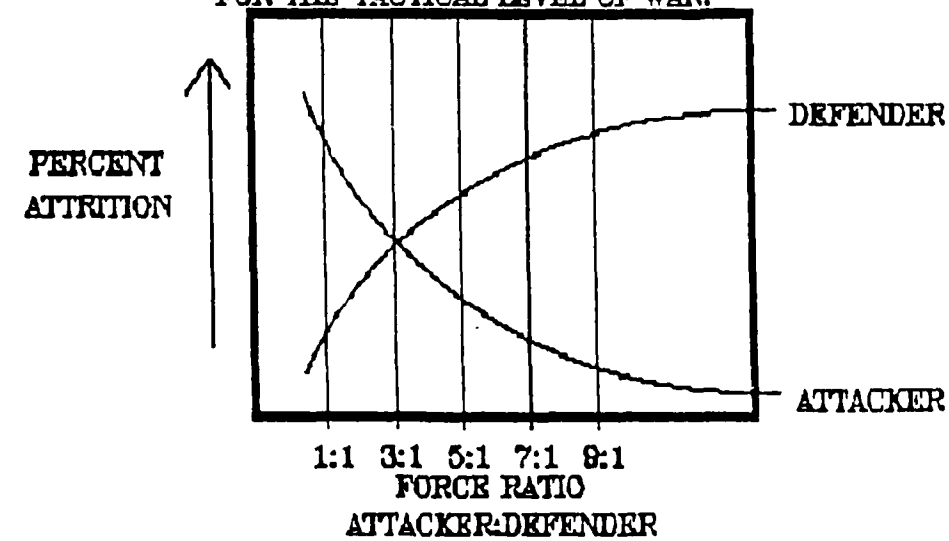


FIGURE 4-7: ATTRITION AS A FUNCTION OF FORCE RATIO (POSTULATED) FOR THE TACTICAL LEVEL OF WAR.



of magnitude is representative of the comparative losses expected given the force ratios.[10] The intent of these charts is not to provide a scientific solution to the selection of offensive or defensive forms of combat. Rather, they are intended to give the commander a feel for the non-linear effect of the concentration of superior combat power against an opposing force. Additionally, they graphically portray the comparative disadvantage in failing to possess adequate combat power when assuming the offensive.

CONCLUSIONS ON THE QUALITY OF STRATEGIC GUIDANCE

The quality of strategic guidance and strategic doctrine is crucial to the effective and efficient conduct of war at the lower levels. The strategic concept should integrate all aspects of the nation's power (social-political, economic-geographic, and military) in a cohesive and coordinated fashion under centralized control towards well defined strategic ends.[11] The ends selected should be consistent with the means available and the strategic concept devised. The concept should reflect existing strategic doctrine for the level of intensity that, in turn, specifies the roles, responsibilities and missions of the various national agencies (As described in Appendix B). Although strategic concepts can and should be modified as the conflict progresses, "Field Marshall Keitel pointed out at the Nuremburg trials: A mistake in strategy can only be made good in the next war."[12]

THE OPERATIONAL LEVEL

Many of the principles developed above pertain to the operational level of war. However, there are several central theoretical concepts which are unique to and exert a great influence over the practice of operational art. This section

will develop a theoretical framework for the development of campaign plans. I will specifically address the concepts of centers of gravity, decisive points, and culminating points in relation to campaign plan formulation. Finally, I will conclude the analysis with a discussion of the underlying aspect of all successful campaign plans: the seizing of the operational initiative.

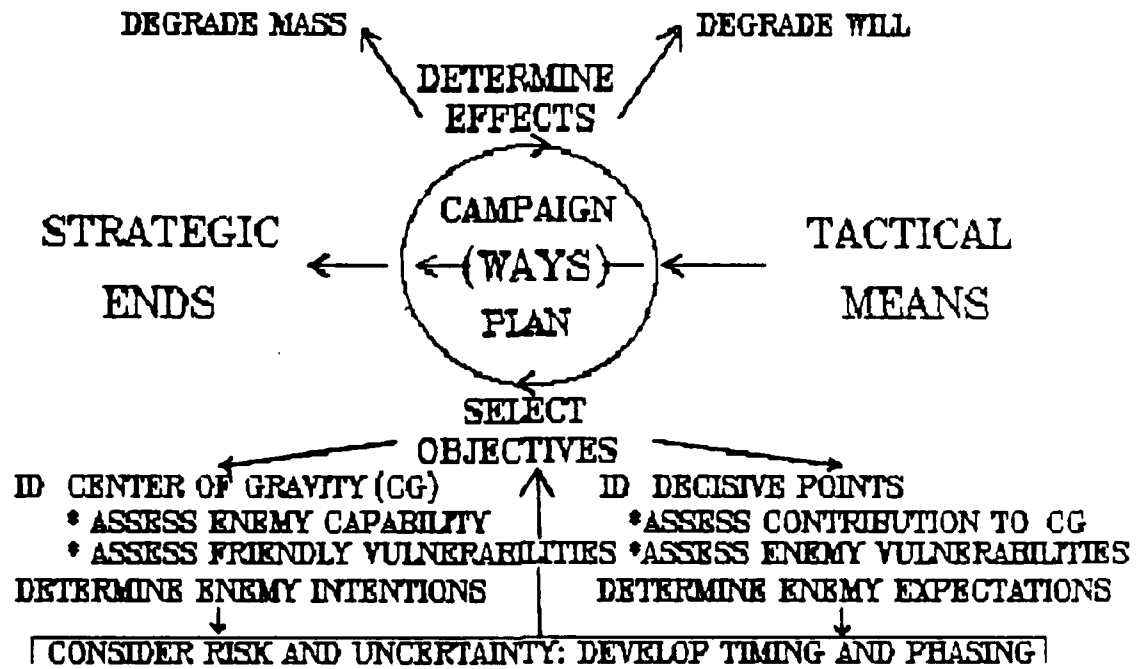
OVERALL CONSTRUCT FOR CAMPAIGN PLANNING

The campaign plan is the product of the operational artist. It is the canvas on which the operational planner paints the ways in which he intends to accomplish the strategic ends given his available means. The quality of the campaign plan is an essential ingredient to the successful conduct of war. It is the basis for both effective and efficient operations.

Figure 4-8 depicts the overall process of campaign planning. It expands upon the model depicted earlier in Figure 4-1 and illustrates the iterative process of balancing ends, ways and means with feasible operational concepts. The key to the process is the determination of military objectives and the corresponding probable military effects on the combat power of both the enemy and friendly forces. The selection of objectives involves the determination of both the enemy's center of gravity and the related decisive points and takes into consideration uncertainty and risk. The expected effects, in turn, must achieve the strategic political ends.

Unless it is a *campaign of annihilation*, e.g., the strategic ends are expected to be achieved in one climactic battle, then a series of battles must be planned; each with its respective

FIGURE 4-8: THE PROCESS OF OPERATIONAL CAMPAIGN PLANNING.



objectives and corresponding effects. In this case, timing and phasing must be outlined, the operational culminating point avoided and operational pauses programmed. Assessments of uncertainty and risk play a central role in the process of campaign plan formulation. For events with a high degree of uncertainty, the operational planner must prepare "branches" that will accomodate possible outcomes. Similarly, he must prepare "sequels" to planned combat actions where and when there exists a high degree of risk. The resultant plan reflects a cohesive vision of what the operational artist postulates as a concept for achieving the strategic ends within his theater. Due to the dynamics of war, this process is continuous and complex as objectives are or are not achieved, anticipated effects realized, and branches and sequels pursued.

DETERMINING CENTERS OF GRAVITY

The concept of center of gravity has been the subject of much controversy and debate.[13] The identification of both friendly and enemy centers of gravity is a crucial aspect of campaign planning. The determination of the proper center of gravity allows for the efficient and effective employment of friendly combat power so the effects disrupt or destroy the decisive element of the enemy The identification of the enemy's center of gravity is dependent upon an accurate assessment of friendly force vulnerabilities and enemy force intentions to exploit those vulnerabilities.

The enemy's center of gravity is the force package the enemy intends to use as the primary mechanism to defeat friendly forces. It is directed against friendly force vulnerabilities

that are expected to reduce significantly friendly force capability. The enemy center of gravity is the force or element that the enemy intends to use as the "arm of decision" to achieve victory in the battle or campaign. It is the "arm of decision" because of both its capability *and* the enemy's intention to use it decisively. Thus, the determination of the center of gravity is dependent upon identifying enemy force capability and intentions which, in turn, relates to friendly force vulnerabilities. Likewise, the friendly force's center of gravity is the force package that the friendly commander intends to employ against the enemy vulnerabilities to achieve the decision. The opposing forces' centers of gravity are inter-related by each forces capability, intentions and vulnerabilities.

DETERMINING DECISIVE POINTS

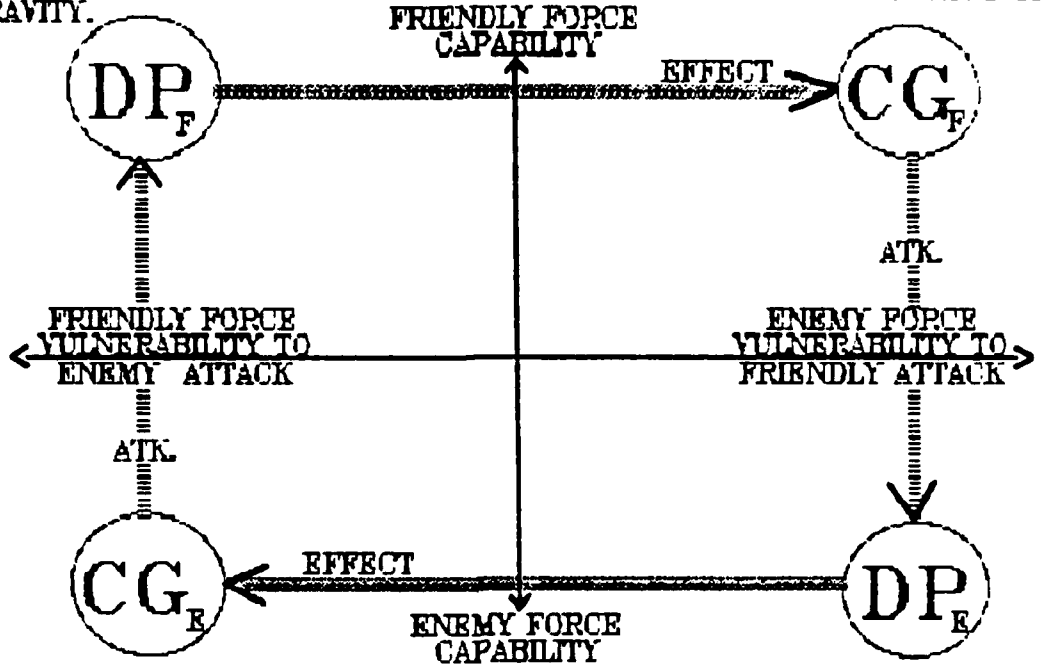
Complementing the determination of centers of gravity is the identification of decisive points. Decisive points depend upon an assessment of the contribution of a point; either a unit, activity, or geographic location etc., to the combat power of the enemy and the vulnerability of that point to friendly attack. Like centers of gravity, they are a function of both capability and vulnerability. However, decisive points can differ considerably from centers of gravity in their physical manifestation. Where divining centers of gravity depends on predicting enemy intentions, the selection of decisive points requires discerning enemy expectations.

What makes a point decisive is the *significant effect* that its destruction or disruption has on degrading the combat power

of the enemy and its vulnerability to attack by friendly forces. Enemy expectations dictate decisive point vulnerability because the enemy normally takes steps to secure those points that have obvious contributions to enemy force capability and are accessable to expected friendly force attack. This reduces the point's vulnerability and makes its attack infeasible or prohibitive. The significance of a decisive point's contribution to the enemy's combat power depends upon its *effect* on the enemy's center of gravity. That's what makes its destruction, disruption or capture decisive. Its simplest manifestation is the center of gravity of the enemy. However, this "direct approach" of pitting your center of gravity directly against the enemy's is usually the most inefficient since the enemy's "arm of decision" is usually the least vulnerable. What is unique about decisive points is that their identification depends upon their *contribution* to combat power and not necessarily the physical manifestation of the combat power.

Clearly the concepts of center of gravity and decisive points are related but distinct. Figure 4-9 depicts the two concepts in terms of enemy and friendly force capability, vulnerability and perspective. The solution of determining enemy centers of gravity and decisive points is one of determining enemy capabilities, enemy intentions and enemy expectations. The relationship between centers of gravity and decisive points can be likened to that of the primal and dual solutions to a linear programming problem. The optimal solution to determining the enemy's center of gravity and decisive points will provide complete information on the optimal solution of the friendly center of gravity and

FIGURE 4-9: RELATIONSHIP BETWEEN DECISIVE POINTS AND CENTERS OF GRAVITY.



DP_F = DECISIVE POINT OF FRIENDLY UNIT, SUBJECT TO ENEMY ATTACK.

DP_E = DECISIVE POINT OF ENEMY UNIT, SUBJECT TO FRIENDLY ATTACK.

CG_F = CENTER OF GRAVITY OF FRIENDLY FORCE.

CG_E = CENTER OF GRAVITY OF ENEMY FORCE.

(CG) = FORCE PACKAGE INTENDED AS "ARM OF DECISION."

(DP) = UNIT, ACTIVITY, GEOGRAPHICAL LOCATION, ETC. THAT SIGNIFICANTLY CONTRIBUTES TO CENTER OF GRAVITY.

= INTENDED USE OF CENTER OF GRAVITY FORCE PACKAGE AGAINST OPPOSING FORCE DECISIVE POINT.

= EXPECTED INFLUENCE OF SUCCESSFUL ATTACK AGAINST A DECISIVE POINT ON THE OPPOSING FORCE'S CENTER OF GRAVITY.

decisive points.

Unfortunately the enemy is usually uncooperative in conforming to what we determine as his intentions and expectation. Thus, we develop the dual solution from our perspective with a corresponding error. To help reduce this uncertainty and error, we develop deception plans. Deception plans reinforce, from the enemy's perspective, what we determine as the enemy's estimate as <u>our</u> intentions and expectations. The deception plan is designed to confirm what should already be the preconceived notions of the enemy and thus permit our concept to triumph. Appendix E, describes an historical example that illustrates the concepts of centers of gravity, decisive points, and the influence of deception for the Normandy campaign in WWII.

Additionally, the centers of gravity and decisive points change based upon the competing forces and their comparative degree of success in achieving their conflicting objectives. Consequently, intentions, capabilities and expectations are all in a dynamic state of change. It is the ability to adjust the assessments during the course of the campaign that is as or more essential than the initial formulation of these operational abstractions. The acumen of our judgements, the speed of our reaction and the quality of the revised campaign directly attack the intentions of the enemy and defeats his plan.

THE ELEMENT OF SURPRISE AND SELECTION OF OBJECTIVES

The selection of objectives to achieve the desired effect is another key aspect in campaign planning and relates directly to the determination of decisive points. As previously mentioned, the decisive points are selected based upon the *potential effect*

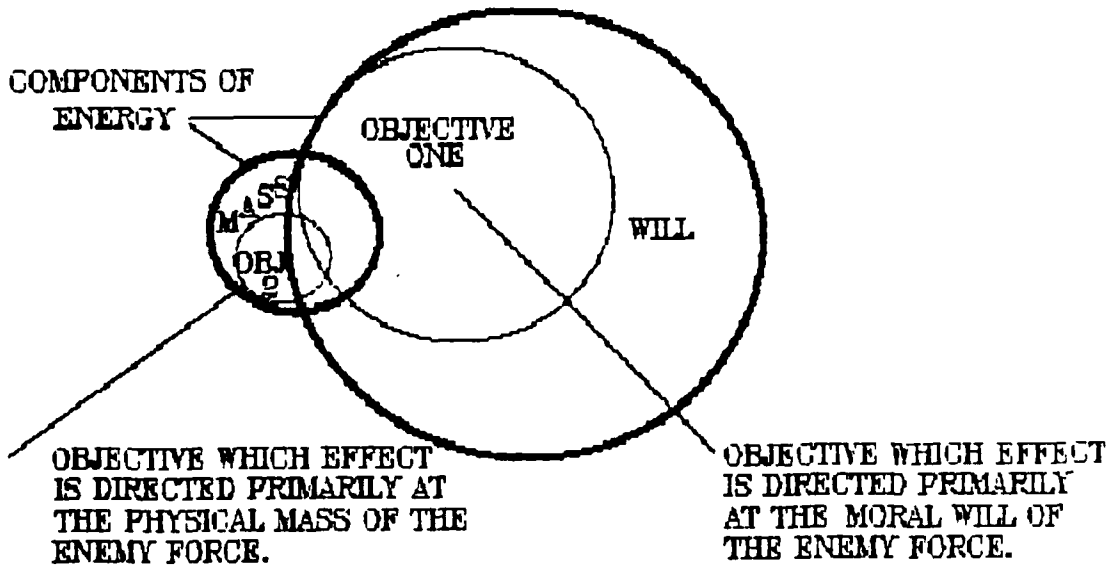
that their destruction or disruption will have on the enemy's combat power. According to the postulated model, there are four ways that you can influence the enemy's combat power: (1) degrade his physical capability, (2) degrade his moral will (3) decrease the efficiency of applying those elements, or (4) any combination of the previously listed factors.

The quality of the objectives selected has a direct impact on the quality of the campaign plan. Within the energy model, moral effects are represented as exponentially influencing energy. Thus, the objectives selected should seek to capitalize on moral effects whenever possible. In war, these effects are recognized when the opposing force is surprised by what we attack, how we attack or by the effectiveness of how or what we attack. This goes back to the assessment of the enemy's expectations when determining decisive points.

The decisive point may be the enemy's center of gravity if the enemy is surprised by our ability and capability to destroy it. Thus, attack against the enemy's flank, attack against his rear, cutting of the enemy's lines of operations, lines of support, and/or lines of communication usually has a much more significant moral *effect* in degrading the enemy's overall combat power than direct physical *effect*. Whereas attack against an enemy's main force where he expects combat, even if successful, will result in some degradation or both will and mass, it will not achieve the same exponential *effect* of an attack against an objective focused on his will.

Figure 4-10 is a pictorial representation of the general effects of two different objectives. Objective Two is directed

FIGURE 4–10: SELECTION OF OBJECTIVES BASED UPON EFFECT.



against the enemy's main force in a manner and degree that is expected by the enemy. It reflects the degradation of his force in both the physical and moral domains. Objective One is directed against a decisive point and reflects the overwhelming influence that unexpected attack has on the moral aspect of the force. The selection of objectives that are unexpected with the intent of maximizing moral effects through surprise is the basis for what B.H. Liddell Hart terms the "indirect approach". It is the accomplishment of the *effect* in the most economical manner that avoids the enemy's strength and maximizes friendly capability.

BATTLEFIELD GEOMETRY

Another key activity in developing the operational concept is fitting the campaign concept to the ground and the capabilities of both friendly and enemy forces. This requires the apportionment of the battlefield through the designation of theaters of war, theaters of operation, lines of operation, bases of support, lines of support, and lines of communication. Although many of these decisions are done as an integral part of the previously detailed operational analysis, the phasing of operations may be frequently dictated by major changes in one or more of these relationships. Thus, these decisions deserve individual consideration and analysis.

The apportionment of the battlefield must consider the dynamics of the operational concept as well as the identified centers of gravity, decisive points, and culminating points. The development of subordinate command headquarters, assignment of military objectives and the combining or splitting of operational

and tactical areas of responsibility should all maximize efficiency and minimize confusion and turbulence within the campaign. The product should be simple in concept and clear in defining areas of responsibility throughout the course of the campaign. Generally, one cannot threaten or attack an enemy's rear or LOC without increasing the exposure to ones own line or operation. As a consequence, the degree of risk assumed by the operational commander is usually directly related to many of the decisions on spatial allocations and geometric relationships.

THE CONCEPT OF CULMINATION

The concept of the culminating point is clearly and simply defined within FM 100-5, Appendix B.[14] However, like most concepts of war, what appears simple in principle is complex in application. According to FM 100-5, the culminating point of the attack is reached when the attacker can no longer continue offensive operations without <u>risking</u> overextension, counterattack and defeat. FM 100-5 goes on to state that the art of attack is to accomplish the objective before culmination is reached and the art of defense is to hasten the arrival of the attackers' culmination.[15] Predicting and recognizing points of culmination is essential to the phasing and execution of successful campaigns. Key to accomplishing this is understanding comparative rates of combat power dissipation and reinforcement in terms of presented opportunities and exercised exploitation. This discussion elucidates the concept of culminating point in regards to the combat power paradigm previously presented and develops a graphical model for depicting the relationship between two competing forces.

The key factor in defining the offensive culminating point is determining the level of comparative combat power that is sufficient for the defender to conduct a counterattack, counter-thrust or counter-offensive and defeat the enemy attacker. As the previously developed models attest, the computation of comparative combat power is complex and difficult. This is exacerbated by the profound influence of moral factors and qualitative influences at every level of war. However, the operational artist must have an appreciation of all these aspects and some method for analysis and judgement if he is to develop feasible campaign plans. The intent of this analysis is to develop general rules of thumb that can aid judgement and not to define exact force ratios that accompany the commander to the field.

The combat power advantage needed to assume the offensive was previously estimated as two to one at the operational level and three to one at the tactical level. With this advantage, the attacker can expect to receive the same *rate* of casualties as the defender. However, as previously mentioned, *counter-actions* are considered part of the defense and thus will be treated differently than the assumption of the offensive at either the tactical or operational level.[14] Thus, a reasonable force ratio allowing for the successful conduct of a counter-action needs to be postulated.

In the attack, the defender commits the preponderence of his forces in the offensive. Assuming that the defender does not succumb to a decisive defeat, the defender is afforded the opportunity to use the inherent strength of the defense. The

defender, can economize his forces in unthreatened sectors while simultaneously dissipating the enemy's combat power at a higher rate in areas where the combat power ratios are less than three to one using the strength of the terrain.

The conditions unique to a counter-action should allow the defender the opportunity to succeed with a combat ratio of less than three to one. I propose that a successful counter-action could be conducted when the comparative force ratio reaches a level of one to one. Thus, when the attacker:defender comparative combat power ratio reached 1:1 the attacker *risks* defeat by a counterattack by the defender and has therefore reached his theoretical culminating point. Implicit in this combat power generation and economization, are the requirements of conducting operational maneuvers and concentrating operational fires. Naturally these aspects become part of the concept as force requirements and projected combat attrition are iteratively assessed.

The previously listed Figure 4-7 provides a general guideline for predicting comparative combat losses for tactical battles based upon the combat power ratio of each force. Unless the battle is climactic and decisive, several operations will be sequenced in a campaign in order to achieve the strategic ends. Also, based upon the comparative combat power ratios in each battle, each force will suffer a certain degree or degradation to its capability. However, what is important is the *comparative rate* that each opponent loses combat power during the battles and the comparative rate that each opponent's power is either dissipated or built-up during the period between battles.

Figure 4-11 represents the conduct of a campaign where a series of operations transpire over time and which culminate with a decisive victory over the enemy. The figure depicts a simple campaign of annihilation with the attacker never changing over to the operational defensive. Similarly, the defender never assumes the operational offensive. These events would necessitate the development of a new set of curves reflecting the selection or the different forms of war.

In Figure 4-11, the combat power ratio at the operational level reflects the boundary conditions at the start if the campaign, e.g., at t=0. The curves represent the conduct of the campaign and the sequence of battles conducted. The campaign outcome is dependent upon both the beginning combat power ratio and the quality of the campaign as reflected by the results of the battles. The sharp jumps in the jagged lines reflect the comparative adjustments to the combat ratios based upon the rate of combat power loss or gain as a result of the battles. The smooth lines are an approximation of the combined effects and are redrawn in Figure 4-12 for clarity. Each tactical battle casualty rate could be *projected* (I shall not say predicted) by the combat power ratio generated by each side for each operation based upon the curves in Figure 4-7. In the campaign illustrated in Figure 4-12, the attacker expects to overextend himself and risk counter-thrust and defeat but is depending upon the defender not seizing the initiative. Appendix D contains several graphical representations of sample campaigns where the attacker begins with adequate or inadequate combat power and where the culminating point is or is not reached by the attacker.

FIGURE 4–11: OFFENSIVE CULMINATING POINT IS REACHED, HOWEVER, DEFENDER FAILS TO SEIZE THE OPERATIONAL INITIATIVE; ATTACKER WINS.

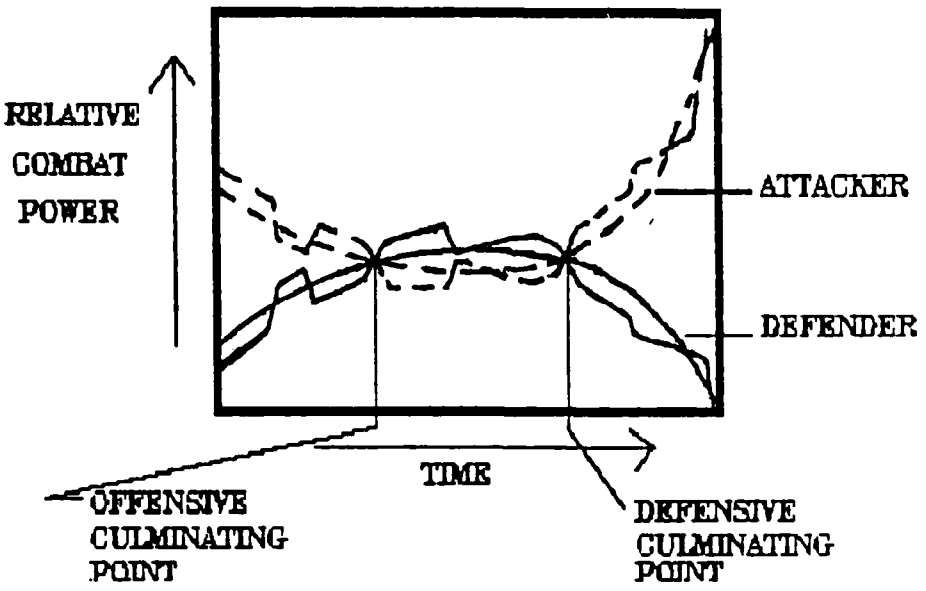
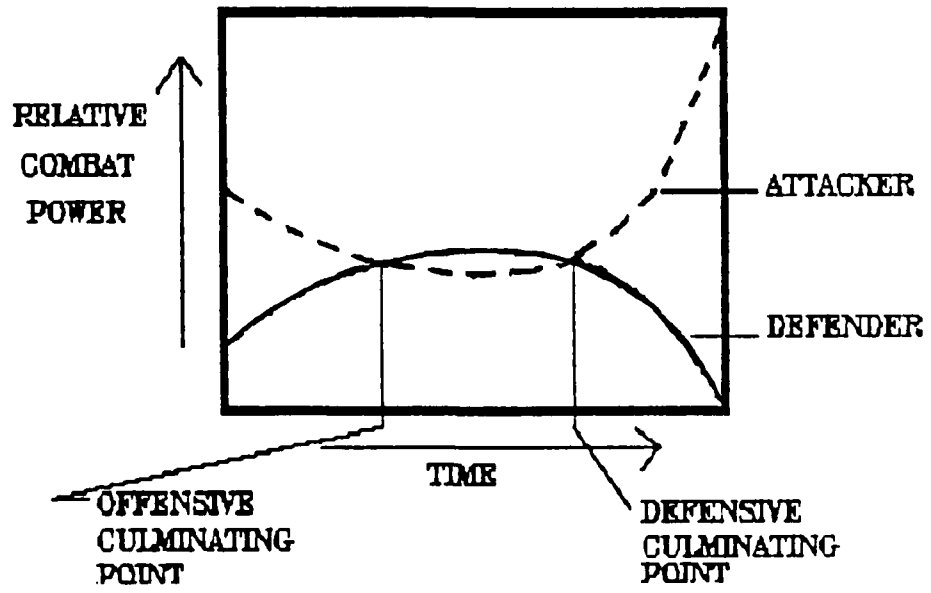


FIGURE 4–12: OFFENSIVE CULMINATING POINT IS REACHED, DEFENDER FAILS TO SEIZE THE INITIATIVE (CURVES SMOOTHED FOR CLARITY).



Additionally, the curves represented in Appendix D show examples where the defender did or did not seize the opportunity to exploit the attackers overextension.

THE DEFENSIVE CULMINATING POINT

In designing campaign plans, the culminating point for the attacker should be anticipated and the original campaign plan phased to accomodate force regeneration. An alternate approach to phasing to prevent reaching the culminating point would be to risk overextension with the *expectation* that the defender will reach his defensive culminating point before the defender is able to seize the initiative.

The defensive culminating point is the point where the defender can no longer capitalize on the culmination of the attacker. It is difficult to predict because it depends primarily on the moral collapse of the defender. Once the collapse occurs, the culmination is easily recognized. However, this *post facto* analysis does not help much with the planning of the campaign except to recognize that it does exist. Generally, the offensive culminating point is an opportunity while the defensive culminating point is an event. The former involves an assumption of risk, while the latter signals the beginning of the end.

Within each force there exists a threshold below which the morale of the force and will to fight collapses at an exponential rate. James Schneider outlines this effect in his discussion of the influence of suppression on soldiers in battle.[17] This can also apply to the operational commander when he is faced with a seemingly impossible operational situation. This phenomenon is

also highlighted in the recent article by Robert McQuie on determining the reasons for defeat in battles. In his study, McQuie examined 52 battles and determined that the reason cited by the loser for defeat in 64% of the battles was the use of maneuver by the enemy... "recognition of defeat appears to have arisen from a look toward the future and an enemy's potential capabilities rather than toward the past and the casualties he has inflicted."[18]

Thus, there appears to be a point where the attacker's continued maneuver in the offensive will achieve an exponential effect on the defender's moral element of energy and drastically reduce the defender's combat power. When this threshold is reached, the defender has arrived at his defensive culminating point from which he can no longer capitalize on an attacker's culmination.[19] The opportunities presented by both the attacker and defender together with each opposing forces capability and willingness to exploit constitutes the critical function in the practice of operational art .... *seizing the operational initiative.*

SEIZING THE OPERATIONAL INITIATIVE

Initiative means setting or changing the terms of battle by action. It implies an offensive spirit in the conduct of all operations. Applied to the force as a whole, initiative requires a constant effort to force the enemy to conform to our operational purpose and tempo while retaining our own freedom of action.[20]

The above analyses have focused on the initial development of the campaign plan. In the analyses, I have avoided discussion of the actual political compromises made when developing a campaign plan. These same influences also impact upon the dynamic nature of campaign planning and contribute to the factors compelling

change.[21] Although the dynamic nature of war has been integrated in the paradigms developed previously, the dynamics of campaign planning deserves special attention.

Helmuth von Moltke (the elder) once said, "No plan survives contact with the enemy."[22] In fact, the only thing the campaign planner can be sure, is that the campaign <u>will not</u> proceed as planned. However, a campaign plan provides purpose, direction, motivation and continuity to the entire theater of operations. It gives relevancy to tactical battles which serves to motivate the subordinate commanders and units and thus assumes a relevancy all its own. Thus, the uncertainty inherent in war is no excuse for not developing a plan.

Conversely, the existence of a plan should not constrain its modification once the assumptions and conditions upon which it was based become overcome by the results of uncertainty. The modification and adjustment of the campaign plan to gain and retain the operational initiative based upon the changing operational environment, thus becomes the quintessential task of the operational level commander. Since it is much easier to predict enemy reaction than enemy action, with the initiative comes an overwhelming advantage in predicting future conditions of the chaotic battlefield. Prediction and visualization of future battlefield conditions forms the basis of all other activities within operational art.

There are several key aspects of the definition of initiative cited from FM 100-5 above. These include the requirement of changing the terms of battle, forcing the enemy to conform to our operational purpose <u>and</u> tempo, and retaining our freedom of

action. Closely related to these requirements for gaining the initiative, is the concept of agility. Agility is "the ability of friendly forces to act faster than the enemy- [it] is the pre-requisite for seizing and holding the initiative."[23] Conceptually, the exercise of agility is the *way* of achieving the *ends* of gaining and maintaining the operational initiative.

The concept of initiative has been the object of much discussion. Some consider it as a football that is passed from one side to another based upon who is attacking at any point in time. In other words, it is an all or nothing proposition and depends on the offense. Others consider that initiative is a matter of degree; a tug of war between two competing sides with one side having a comparative advantage based upon the comparative degree of conformity to each side's operational purpose. At the operational level, the latter concept appears to be theoretically consistent with both the existing operational environment and FM 100-5's definition.

Generally, operational agility is affected by two major factors: operational maneuver capability and the efficiency of the decision cycle. Operational maneuver capability is a function of organizational and sustainment flexibility, existing doctrine, and tactical mobility. The efficiency of the decision cycle is a function of leadership, command and control doctrine and the corresponding processes established for planning, observing, and executing war at all three levels. Thus, operational level agility represents the rapidity by which an operational commander can act and react to gain the operational initiative.

Figure 4-13 depicts a paradigm of the decision cycle at all three levels of war.[24] The circumference of each cylinder represents the relative amount of time required to complete one full revolution of the decision cycle at each level. In war, the dimensions of the decision cycles are also dynamic with the diameter increasing or decreasing based upon the conditions and situation. However, there is generally a *minimum* diameter for each nation, theater of operations, and army based upon the factors listed above that influences agility. For example, the ability to compress execution is dependent, to a certain extent, on operational maneuver capability. Likewise, the ability to compress observation/sensing and planning is dependent upon the personality of the commanders, the command and control doctrine and the corresponding processes and systems established for these functions. At all three levels, observing, planning and execution is conducted simultaneously. The operational level commander's initial task is to develop a campaign plan that aligns both the plan at the strategic level to the capabilities at the tactical level. In other words, he insures that the cycles are meshed and synchronized to turn in the same direction at the appropriate rates. However, each level of war is continuously influenced by forces and events external to their link with each other. Thus, torque is placed unequally at all levels and complicates the maintenance of both synchronization and contact.

The countervailing torque is particularly evident at the tactical level where the opposing forces come into direct physical contact. (Figure 4-14 depicts this opposing

FIGURE 4-13: DECISION CYCLE AT THE THREE LEVELS OF WAR.

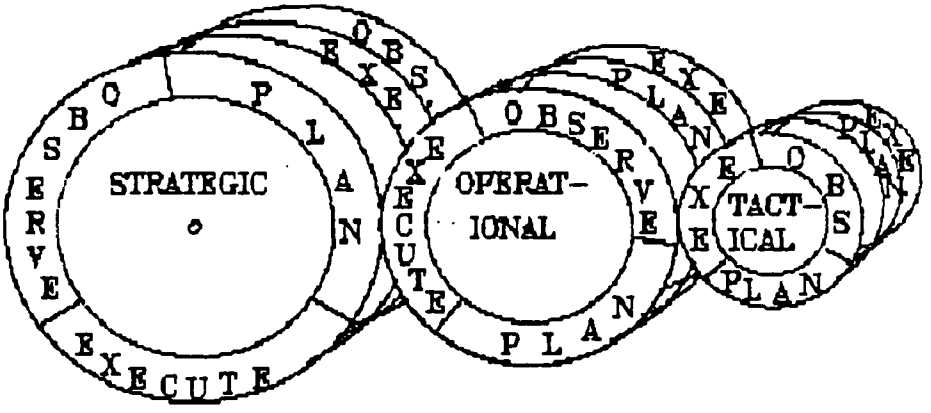
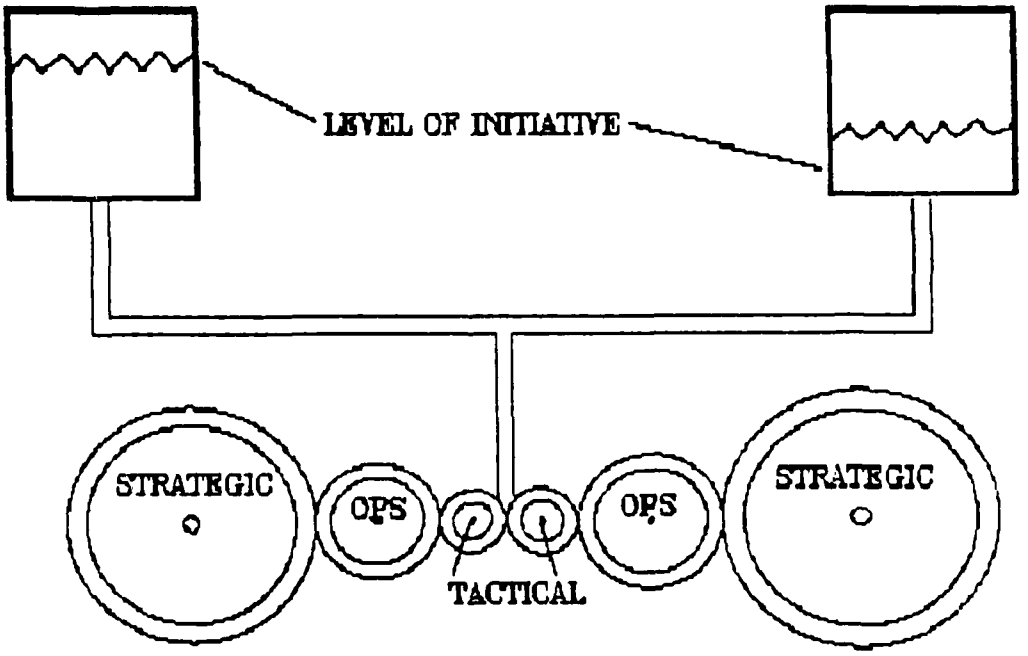


FIGURE 4-14: LEVEL OF INITIATIVE BETWEEN TWO CONFLICTING FORCES



relationship.) The violence, uncertainty, fear and chaos of battles at the tactical level quickly changes the conditions on which the initial plan was based thus forcing action, reaction and counteraction. As each force senses, reacts with new plans and executes, the results begin to favor one side or the other depending upon the speed of reaction and the quality of the response. In this way, one side or the other begins to seize the operational initiative as one side is forced to conform to the other's operational plan and more frequently reacts than acts to the others actions. In Figure 4-14, this is depicted by the fluid, representing initiative, in each of the opposing force's containers. As the results of combat unfold, the initiative gradually shifts to one side or the other based upon the results of tactical actions and the efficiency of the decision cycle to respond to those results at all levels.

As the tactical successes build momentum, the losing side continuously reacts until it collapses. Operating within the enemy's decision cycle causes an exponential deterioration of his combat power because he is consistently *surprised* by the timing of your actions. Therefore, seizing the initiative increases the intrinsic value of every objective regardless of its individual *physical* value. Consequently, the sum of the individual battles are outweighed by their cumulative effect resulting in an exponential collapse.

The campaign conducted by Field Marshal Sir William J. Slim, in Burma during WWII is an excellent historical example of an operational commander working to seize the operational initiative. Slim developed his combat power by purposefully

building the moral and physical components of power. He selected and attacked limited objectives to build confidence within his divisions, he adjusted to the enemy's methods of attack and modified the organization and doctrine of his units. He made an initial assessment of the comparative combat power, chose to conduct an operational defense to attrite the enemy forces, and then followed the successful defense with an operational offensive. Throughout the campaign, Slim worked to seize the initiative by continuously adjusting his campaign so that the enemy conformed to his operational purpose. His seizure of the initiative and corresponding battlefield successes resulted in a decisive victory for the Allies in Burma.[23]

Unexpected success caused by the exponential effects of seizing the operational initiative can also cause an undesirable impact at the strategic level. Rommel's successes in North Africa are a good example where initial unexpected success at the tactical and operational levels resulted in driving a strategic decision. Based on Rommel's success, Hitler chose to provide more forces to a theater of operations which continued to conduct a strategic economy of force mission. There was no corresponding change in the strategic concept other than the mis-allocation of resources away from the German's main effort against Russia. The results at the strategic and eventually operational and tactical levels were catastrophic.[24]

Unexpected success requires the decision makers to adjust their concepts as much as unexpected failure. Adjustments must be made at all levels to maintain the synchronization between the ways, means and ends. Thus, the seizure of the operational

initiative within a theater of operation must be done consistent with the constraints dictated by the operative strategic concept.

SECTION V. CONCLUSIONS

This monograph has approached the concept of operational art from the context of an overall theory on war. The paradigms presented, represent a theoretical construct on the nature of war, the inter-relationship and dynamics of doctrine, and the concept of war energy and combat power as they relate to all levels of war. Since, the operational level of war holds a central position within the theoretical levels, it was essential that any premise be investigated within the framework of all three levels. Throughout the development of the theoretical construct, one central theme emerged that indicate the importance of seizing the operational initiative. This was the dynamic characteristic of all activities in war and the accompanied uncertainty that influences all judgements and plans. This observation led to the establishment of several principles that influence the design and modification of campaign plans within the practice of operational art.

Campaign planning is an on-going activity that must account for the dynamics of the operational environment. The capabilities, intent and expectations of the enemy force must be continuously assessed together with the friendly force capabilities and strategic objectives. New centers of gravity sometimes emerge accompanied by their corresponding decisive points. Such cases require shifts in our own centers of gravity that result in major modifications to the campaign concept. The campaign plan must also adjust to the dynamic influences emerging

from the strategic level. Resourcing, command relationships, campaign phasing and battlefield geometry must be continuously assessed and modified consistent with the emerging demands at both the strategic and tactical levels. The actions and reactions must be done in manner and time that results in a comparative advantage over the enemy. This, in turn, requires a prescience that anticipates results before they occur and/or the vision to divine their implications. All these activities focus on a single objective: gaining and retaining the operational initiative.

Gaining and retaining the operational initiative is not just an important aspect of campaigning ....it *is* the essence of operational art. Seizure of the initiative is the touchstone against which campaigns are *measured*. It requires the application of all the previously developed concepts and principles in a cohesive and dynamic manner. It depends upon processes and power and tactical and strategic synchronization. Understanding the ways, means and ends of war in relation to the planning and conduct of campaigns to seize the operational initiative provides the theoretical foundation for understanding history. Through this understanding, we improve the likelihood that knowledge and technique will evolve into wisdom and art and operational success will lead to strategic victory.

APPENDIX A. A THEORETICAL MODEL DESCRIBING THE DYNAMICS OF WAR

The nature of war is characterized by many multifarious influences all in a constant state of interaction and change. Any model describing war must represent the dynamics of these interrelated influences. The development of the model in Figure 2-1 reflects the dynamic interaction of two opposing forces over time. The model is not intended to be predictive because the outbreak of conflict is dependent upon the dynamics of the multi-dimensional and confounded variables. The model is intended only to represent the relationship between two fictional nation-states based upon the *effect* of their total interaction. The outbreak of war within the model is dependent upon the dynamics of inter-nation dissonance and the internal armed conflict threshold existing within each nation.

Three major interdependent factors influence the uncertainty of both nation-state interaction and the armed conflict threshold. First, is that incalculable moral factors have an overwhelming influence over the physical and quantitative aspects of nation-state interaction. Second, is the effect of positive reaction which results when two competing nations act, counteract, and interact within both the physical and moral domains of conflict. Finally, is the combined effects of uncertainty throughout all levels of nation-state interaction which convolutes and obfuscates all information and increases the likelihood that *rational* positive reaction will be distorted or be a function of genius or luck.[1] Thus, nations can appear to respond in an irrational manner when viewed from the opposing nation-state because they are operating from imperfect information and a different set of values and assumptions. This, in turn, may cause an apparent irrational response from the opposing nation. The resultant activities conducted by both states thus becomes unpredictable.

The model represented in Figure 2-1 depicts a sample inter-nation relationship over many years. The total interaction between the two nation-states includes dissonance and consonance in all areas of interest: geo-economic, social-political, and military. Within the total interaction between nations these sub-areas may be phased. Dissonance may first occur in the economic arena, then transition to the social-political sphere, and finally move into armed violence with the military. However, depending upon the nations threshold, the use of violence in pursuit of national interests may be a first option rather than a last resort. Therefore, the model reflects the total interaction across all areas of interest understanding that the interaction within each sub-area may be phased or even reflect the opposite trend.

The model also depicts the outbreak of armed conflict. In the example, the degree of dissonance increases exponentially upon the employment of violence by one of the competing nation states and exceeds both nations thresholds resulting in war. The period between war and peace is typified by continued dynamics in

the level of conflict and the fluctuating thresholds that determine acceptable conditions for peace. Once victory is attained by Nation B (in figure 2-1), the dissonance moves to consonance as nation building and assistance comes into play. Simultaneously the winner's threshold or tolerance for continued dissonance lowers. Concurrently, the loser's threshold is expected to increase because of the unfavorable experience in the employment of violence. Of course, these trends may or may not be reflective of other similar conflicts depending upon the circumstances involved.

There are several important aspects of this model of war which forms the foundation for the development of the principles and theory that will be applied to the strategic, operational and tactical levels of war. First, is that all aspects of conflict resolution concerns both competing nations. Thus, the *ends*, *ways* and *means* of executing national strategy need to be developed in relative and not absolute terms. Second, is that the entire process is dynamic with the conflict environment continuously in a state of change. Therefore, success is driven by both the preparation for war, at all levels, and the reaction and adaption to the environment once war begins. Third, is that all spheres of influence contribute to both the nature of conflict and conflict resolution. Finally, is that uncertainty will exert an overwhelming influence on both the preparation for war and the dynamic adaption to its emerging conditions once commenced.

APPENDIX B, DOCTRINE ON THE LEVELS OF WAR AND LEVELS OF CONFLICT

The development of sound doctrine is dependent upon its applicability to both the user and the operational environment for which it is intended. Thus, the development of doctrine should include the consideration of the level of war that will apply it and the level of conflict to which it applies. However, the doctrine for each level of conflict is only as good as the operational vision of future war on which it is based.

The levels of conflict serve to classify the operational vision of future conflict into three distinct parts that relates to the level of intensity of the conflict. The level of intensity, in turn, is dependent upon the perspective of the nation-state engaged in the conflict. It is a relative measure reflecting the degree of commitment of available elements of power to achieve national objectives. The levels of conflict divide the continuum of war into three distinct parts and describe the operational vision essential for doctrine development. These levels of conflict dictate unique considerations affecting doctrine at the strategic, operational and tactical levels of war.

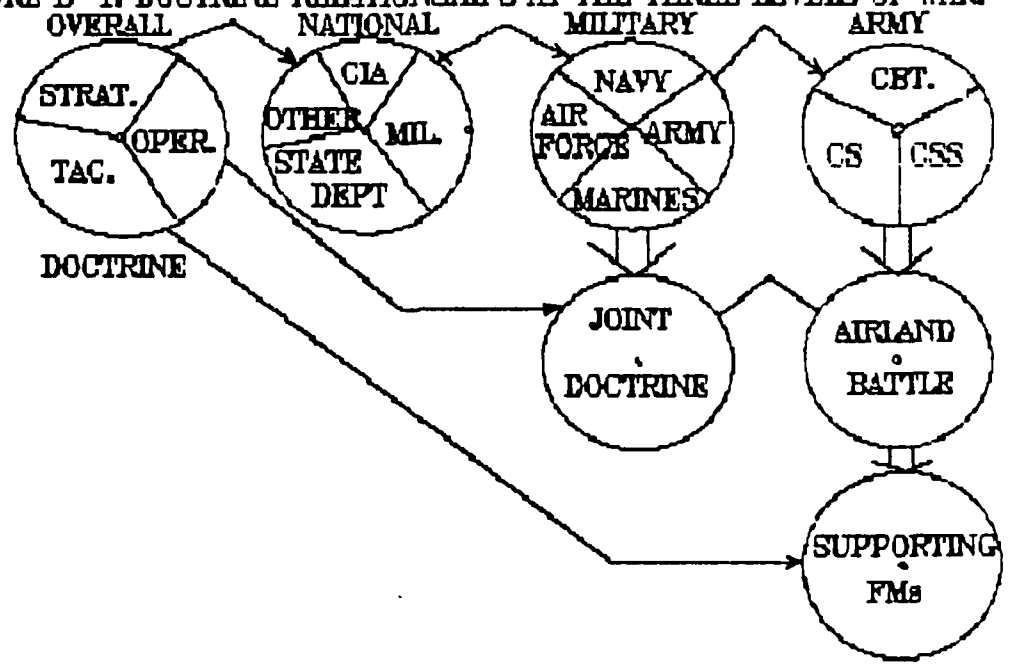
LEVELS OF DOCTRINE AT THE LEVELS OF WAR

The character of sound doctrine also depends upon the level of war that applies it. At the national level, the doctrine specifies a strategy which incorporates diplomacy, economic leverage, and military action carried out by the Department of Defense, Department of State, CIA and other national agencies. From this unified national strategy, the Department of Defense develops a unified military strategy which specifies the roles, tasks and functions of the military services within each environment. Simultaneously, the other agencies develop corresponding strategic, operational and tactical doctrines.[1] The Army develops its strategy which specifies the roles and functions within the broad categories of combat, combat support and combat service support. In the military, this becomes joint operations doctrine and within the Army, AirLand Battle and Operations Short of War. What is essential, is that the Army's eventual doctrine evolves from a common understanding of the operational vision of future conflict and the role and functions specified by the national and military strategies. Thus, the national, military and Army strategies blend to achieve the ends consistent with the levels of conflict outlined in the operational vision of future war (See Figure B-1).

PARTITIONING THE VISION

The description of the levels of conflict provides the vision that can define the nature of future conflict. This vision is critical to the development of sound doctrine and the successful preparation for war. Establishing an operational vision of future conflict at the strategic level provides a common basis of analysis that leads to consistent strategic doctrine and effective strategy. Figure B-2 represents a model by which the

FIGURE B-1: DOCTRINE RELATIONSHIPS AT THE THREE LEVELS OF WAR.



levels of conflict can be discriminated from the continuum of conflict between competing nation-states.

The vertical axis of the model reflects the strategic role of military, political, and economic elements of power. The horizontal axis reflects the increasing intensity of war. At the bottom of the figure are listed some general mission environments in accordance with their general position along the continuum of increased intensity. At the top of the figure are the national objectives associated with the corresponding interval of intensity.

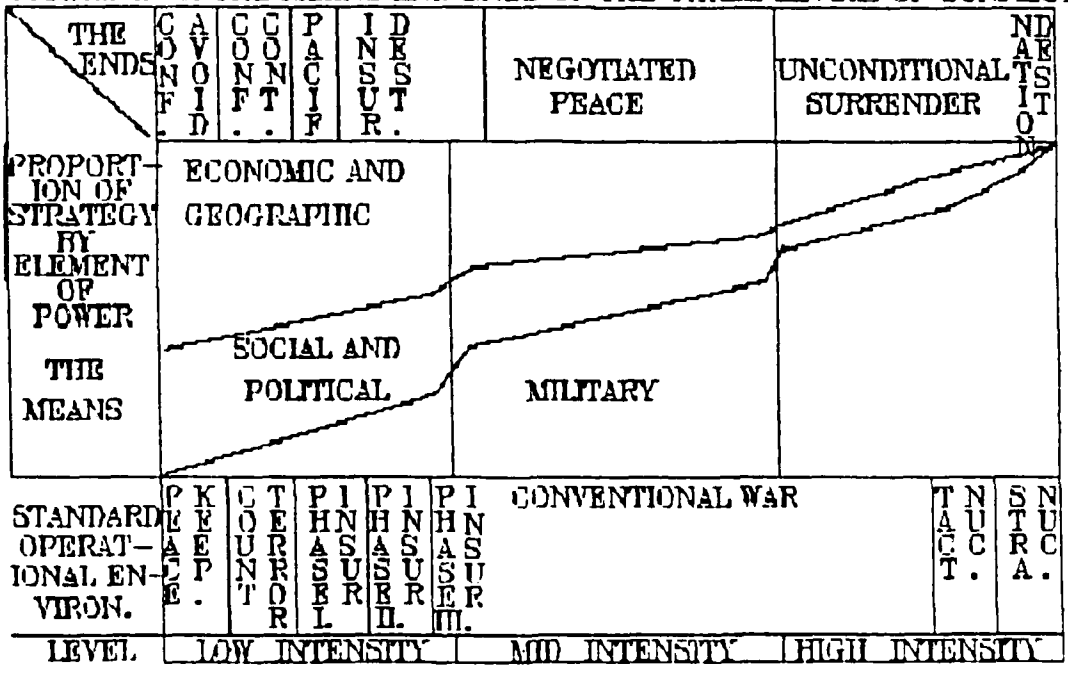
This model is unique in several aspects. First, it uses as a descriptor the proportion of the total strategy. Thus, instead of discussing the use of military in absolute terms, it is done in relation to the overall unified national strategy. Next, it provides a guide to expected national policy objectives (ends) which helps identify the appropriate roles and functions of the governmental agencies associated with the appropriate element of power.

DEVELOPING APPLICABLE DOCTRINE AT EACH LEVEL OF CONFLICT

The model identifies two divisions along the continuum that distinguishes the levels of conflict. These divisions occur where the military's proportion of the total strategy increases exponentially due to the amount of military power required to achieve the desired national objectives. The division between low and mid intensity conflict occurs when an insurgency transitions to Phase III (War and Movement) and our national objective remains the destruction of the insurgents. At this time the amount of military force required increases significantly and continues to increase as the insurgency progresses (even if forcing a change in our national objective to one of a negotiated peace with the insurgents). The division between mid and high intensity conflict occurs when the national objective of conventional war becomes the unconditional surrender of the enemy. To force the unconditional surrender of the enemy requires another exponential increase in the commitment of military power than does a negotiated peace (limited objective). Each level has representative mission environments yet each are unique in the proportion of the means that the military comprises of the total national strategy.[2]

In accordance with the model, low intensity conflict is dominated by social-economic, and political actions. In this operational environment, military action is secondary. Military activity provides support and is in a *supplementary* role to the other governmental agencies. The national strategic objectives may range from conflict avoidance, conflict containment, pacification, insurgent destruction and even include a coup de main inherent in some peacetime contingency operations. When military forces are committed in low intensity environments they frequently perform missions of combat support and combat service support.[3] Generally, this level of conflict is most sensitive to a flawed or absent national strategic doctrine since other

FIGURE B-2: THE MEANS AND ENDS OF THE THREE LEVELS OF CONFLICT



governmental agencies are responsible for the preponderence of action e.g., even an effective military doctrine usually cannot achieve the national policy objectives due to the requirements of the conflict.

During mid-intensity conflict, military operations perform an equally important role with social-economic and political efforts. Some peacetime contingencies, phase III insurgencies where our national objective remains destruction of the insurgents or moves to a negotiated settlement, and conventional war aimed at achieving limited objectives typify this level of conflict. The political and social-economic components of national strategy may also increase in magnitude, however, their proportion of the overall strategy is reduced relative to the military component. At this level of conflict, the military and other governmental agencies play *complementary* roles in the pursuit of national objectives. Unified national strategy should define the lead agency for establishing operational strategy and command and control relationships which insure unity of effort and command.

In high intensity conflict, the ends desired might well include the unconditional surrender of the opposing nation-state or the destruction of the opposing nation-state or its political system of government. The military component of the national strategy dominates but still does not operate in isolation. Social-economic and diplomatic elements of power are employed by government agencies chiefly in support of military operations. Political leadership (and responsibility) remains, even in this environment of unrestrained violence. Within this level, the operational environment may include conventional war and progresses through chemical, tactical nuclear, and strategic nuclear environments.

There are several important points to make about the model which pertain to all levels of war. First is that various operational environments may include wide variances in applied military, social economic, and political elements of power. Thus, each environment is depicted as an interval. Additionally, the *ends* associated with the level of intensity also encompass several possible operational environments. Further, these relationships are not intended to be precise, but rather are used to better illustrate the nature of each level of conflict based upon the means employed.

Secondly, representations of future conflict are seldom perfect. The external factors influencing the operational vision of the future conflict and doctrine may dramatically influence both the nature of conflict and the role that military, social-economic and political factors have on conflict resolution. Thus, the operational vision and levels of conflict should evolve with the reality of actual conflict as depicted in Figure B-2.

Thirdly, the level of war itself is a dynamic phenomenon. Once conflict begins, it may escalate in intensity or even de-

escalate depending upon the application of force by the respective nation-states or as a response to changed policy objectives.[4] National strategy must keep pace with the changing nature of the conflict and continuously adjust both the level of committed power and the relationships between the governmental agencies charged with committing each element of power.

Finally, strategic planning and implementation is subject to the same friction and fog that applies to all military undertakings. Human beings must estimate the required means based upon desired ends. This is usually based upon imperfect information, unrealistic expectations, ill-defined constraints and restraints and personal biases. Thus, it is essential to establish the mechanisms for modifying strategic doctrine once implemented than to continue with a flawed doctrine based upon an imperfect model or inaccurate assessment of the conflict. However, what an established national doctrine allows, is a common foundation from which modifications can be made and understood by the agencies involved.

APPENDIX C, THREE MODELS OF COMBAT POWER USED BY DECISION MAKERS

CGSC METHODOLOGY

The procedure outlined in ST 100-9 considers only the physical comparison of the opposing forces. Values are assigned U.S. and Soviet units based upon their comparative equipment and organizations. For instance, a value of 1.5 is assigned to a U.S. M113 Battalion versus a 1.0 value assigned to a Soviet BTR Battalion. Similarly, a U.S. M1 Battalion is worth 3 units compared to a 2.6 for a Soviet Independent Tank Battalion. Aggregate scores are computed based upon the forces available and the schemes of maneuver developed from the courses of action. The goal is to achieve favorable force ratios at the decisive times and places based upon the envisioned conduct of battles and engagements. The ratios range from a friendly:enemy ratio of 1:6 for a successful delay to a 3:1 ratio for a successful attack. Other tables depict movement rates, delay times and attrition. With the exception of the factors included in the movement table for the achievement of surprise, the methodology completely ignores the moral aspects of force comparisons.[1]

THE WASS DE CZEGE MODEL

The Wass de Czege methodology does include both moral and physical aspects of force comparisons. He develops a relative combat power model that compares the opposing forces firepower, maneuver, protection, and leadership effects together with each opposing forces ability to degrade the others combat capability. Imbeded in each variable are the moral aspects of the force. For instance, within Firepower Effect is crew proficiency and flexibility of employment. Within Maneuver Effect is unit teamwork and esprit and unit mobility skills. Finally the leadership variable includes such factors as dedication, commitment, and moral force. Wass de Czege does not develop a method for quantification or qualitative comparison of these variable within his model. Instead he outlines specific activities and techniques that will enhance friendly and/or degrade enemy capabilities in each area. Thus, his model is useful for expanding the perspective of the campaign planner, but not as a prescriptive methodology for developing campaign plans.[2]

THE QJM APPROACH

Colonel Trevor N. Dupuy, U.S.A. Retired, develops an analytical approach titled the Quantified Judgment Model (QJM) to represent the various factors influencing battle outcome. The model takes a comprehensive approach to identifying the numerous and diverse factors affecting force comparisons. Eleven categories of factors are identified with a total of 73 sub-factors considered. The model considers both moral and physical aspects of combat and attempts to quantify both influences in its force comparisons to predict battle outcome. Of the sub-factors listed, seven are considered probably

calculable however not yet calculated and nine are deemed intangible and probably individually incalculable.[3]

The QJM model combines many of the effects of these unquantifiable factors under what it terms the Combat Effectiveness Value (CEV) for a particular force. This value reflects the normalized force attributes of leadership, training/experience, morale and logistics based upon historical combat results. For instance, as a result of the historical analysis, the data base assigned a ground combat effectiveness superiority of 20-30 percent for German WWII forces over the western allies. Likewise, it awarded the German forces a superiority ranging from 200 percent (1941) to 80 percent (1944) over the Russians in WWII. In a recent conflict analysis, it calculated that the Israelis had a combat effectiveness superiority of nearly 100 percent over the Egyptians in the 1967 and 1973 wars.[4]

The QJM then uses a mathematical formula based upon the quantified factors to predict battle outcome. Battle outcome is depicted by three major items: (1) the extent that each side accomplished their mission; (2) the general terrain advantages accrued to each side based upon their mission and forces; and (3) the efficiency in attaining mission and terrain advantages in terms of comparative casualty loss rates.[5]

Unfortunately, the CEVs are developed solely from a historical perspective using known battle outcomes. The battle results are used to explain the total unquantified factors that led to the victors success. Thus, the methodology and CEV factors suffer from the *post hoc ergo propter hoc* logic error. That is, the CEVs are based upon unknown influences expected to have a similar effect in future battles. Just as the Soviet's CEV can range from 200 % to 80 % over the course of a war, so can the CEVs range drastically for a force between wars. The resultant model does little to explain the dynamics of what caused the difference in effectiveness between two forces nor is it a sound methodology for forecasting future battles.

APPENDIX D, OFFENSE, DEFENSE, COUNTER-ACTIONS, AND CULMINATION

A battle is defensive if we await the attack--await, that is, the appearance of the enemy in front of our lines and within range. A campaign is defensive if we wait for our theater of operations to be invaded....if we are really waging war, we must return the enemy's blows; and these offensive acts in a defensive war come under the heading of "defense"--in other words, our offensive takes place within our own position or theater of operations. Thus, a defensive campaign can be fought with offensive battles, and in a defensive battle, we can employ our divisions offensively.[1]

Carl von Clausewitz, On War

INTRODUCTION

The concepts of the offense and defense are crucial to forming the theoretical relationships inherent in campaign planning. To reach the offensive culminating point, one must necessarily be on the offensive. But where does offense turn to defense and defense turn to offense? Is it before, after or as a result of a counter-action by the defender. How do offensive operations differ from counter-action operations at the three levels of war? Are they related and/or dependent?

To understand the complexities of offensive and defensive culminating points, one must first make the distinction between offensive operations, defensive operations, counter-action operations, and their relationship to initiative.[2] Distinguishing between these concepts at the three levels of war requires recognizing the differences in ends, ways and means in terms of time and space and enemy and friendly intentions and expectations. This section will develop a framework for distinguishing between these *forms of war* at the three levels and use the concept of culmination to highlight their relationships during the dynamics of differing campaigns of annihilation.

OVERALL CONSTRUCT

The *form of war* (offensive or defensive) depends upon the ways, means and ends employed at each level and by each opposing force. The timing of operations, the ground over which they are conducted and the intentions and expectations of the opposing forces all serve to define the ways, means and ends that identify the form of war. I will establish the conceptual definitions for the forms of war and use these definitions to build upon the concepts central to the practice of operational art. During the analysis, the ends and means are assessed in terms of positive or negative aims and methods. Also, the means and ways are examined from the perspective of the preponderence of forces used and the location and timing of their employment.

Positive ends require the attainment of an objective that exceeds the pre-conflict status quo. The *intention* of the

commander in the offense is to seize, capture or conquer by *action* using the advantages of surprise and maneuver. The expectation of the attacker is that the opposing force will defend and react. Negative ends specify the retention of the pre-hostility status quo or the establishment of the pre-conditions that allow the force to assume the offensive following the successful defense. The intention of the defender is to preserve and deny using the advantage of terrain and to use maneuver, in *reaction*, against the committed attacking force. The expectation of the defender is that the enemy will concentrate his forces in the attack to achieve surprise.

The form of war or maneuver is also related to the ways in which the means are employed. Generally to conduct an offensive, the preponderence of the subordinate levels forces are committed to the attack. Similarly, in the defensive the preponderence of forces at the next lower level are committed to defense. A counter-action within the defense, at all levels, is normally conducted by only a portion of the force within a pre-defined and previously controlled area. The counter-action capitalizes on both the strength of the terrain and the surprise and concentration inherent to maneuver. The counter-action is part of the defense and is conducted with less notification over a shorter period of time with more limited aims than are offensive actions. Again, the counter-action is conducted against an enemy whose intentions are themselves one of attack and who are expecting a defensive posture. Conversely, an offensive action is conducted against an enemy expecting an attack and whose intention is to defend and react. The combat power ratio needed to conduct a successful defensive counter-action is far less than that required of an offensive action.

STRATEGIC LEVEL

At the strategic level, the *strategic offensive* is assumed when the nation has as its ends improving a pre-hostility social-political, geo-economic and/or military condition. Additionally, the nation commits the preponderence of its power to the offensive on the territory controlled or sympathetic to the opposing forces. The preponderence of forces would involve the forces at the operational level in their respective theaters of operations or theater of war. Thus, there may be three theaters conducting operational offensives while one or two may be conducting the operational defensive. Therefore, the strategic offense depends on decisions concerning all the aspects of ends, ways and means. These aspects also define the strategic defensive.

The *strategic defensive* takes place on the territory friendly to the defending force with the aim of regaining or retaining the pre-hostility status quo. An alternate or complementary aim may be to exhaust the enemy forces as a prelude to the assumption of the strategic offensive. The preponderence of forces within the subordinate theaters of operation are on the operational defense. Advances by enemy forces within the theater of operation causes the shortening of the defender's lines of operation,

communication and support and thus accrues a comparative material advantage to the defender.

The *strategic counter-offensive* occurs within the context of the strategic defensive. However, normally one or more subordinate theaters of operation are on the operational offensive. Additionally, the majority of ground operations are confined within the pre-hostilities territorial boundaries or on territory whose population is favorably disposed towards friendly forces. Also, the strategic counter-offensive happens relatively faster than a strategic offensive and is a result of opportunities presented by the conduct of the strategic defensive. Finally, its aims are the same as the strategic defensive and focus towards re-establishing the pre-hostilities status quo or creating the conditions by which the strategic offensive can be assumed.

OPERATIONAL LEVEL

The *operational offensive* is also typified by positive aims. It may be conducted either as a part of the strategic defensive or strategic offensive. However, its overall positive aim varies directly within the strategic framework. Within the strategic offensive, the positive aims are obvious. Within the strategic defensive, a subordinate theater of operations may assume the operational offensive against enemy forces conducting an economy of force mission. The operational aim within this theater is thus the destruction of the enemy and the threatening of the enemy's defensive posture. Operations penetrate into terrain controlled by the enemy, although it may still be within friendly territorial boundaries. The preponderence of *tactical* forces within this theater are employed in the attack against enemy forces who are primarily in the defense. One aspect of the operational offensive is the forward extension of the lines of operations and support that usually require a forward displacement of the operational base(s) of support.

The *operational defensive* has a negative objective and can take place in conjunction with either the strategic offensive or defensive. Operations conducted within the operational defensive are usually on terrain under the control of the defender. The preponderence of tactical combat power fights in the tactical defense. Within the operational defense, the campaign planner may design defensive campaigns of annihilation to destroy attacking forces and set the pre-conditions for the operational offensive. This usally requires a cooperative attacker as well as the assumption of a significant amount of risk by weighting the counter-thrust force with tactical elements.

The operational *counter-thrust* is part of the operational defensive. Usually only a portion of the available tactical forces are committed in the attack. The intent of the operational counter-thrust is to fulfill the design or aim of the operational defensive. It is employed in a relatively more rapid manner than the operational offensive and is directed against an enemy that is primarily in the offensive or in an operational pause as part

of an operational offensive. The counter-thrust is usually executed without significantly altering the geometry of the battlefield or major displacements of bases of support.

TACTICAL

The same general rationale applies to the concepts of the *tactical attack, defense, and counter-attack*. The proportion of forces employed, the timing of their employment, the terrain over which they are employed and the intention and expectations of the opposing forces as to ends, ways and means all serve to define the tactical attack, defense and counter-attack. Like the previous levels, the operational offensive or defensive influences but does not dictate the tactical form of war.

THE FORMS OF WAR AND THEIR RELATIONSHIP TO INITIATIVE

The force conducting the offensive form of war does not necessarily possess the initiative. Initiative depends first and foremost upon the degree that each side conforms to each others operational purpose and tempo.[3] Although the offensive forms of war usually give the attacker an advantage in dictating the tempo, it does not guarantee that the defender will conform to his purpose. Perhaps the most effective exercise of operational art is to position defending forces so that the attacker *must* attack in a manner that produces the maximum advantage to the defending forces.[4] The initiative flows to the side who develops and adjusts his campaign and forces the opponent to conduct tactical operations favorable to his own operational purpose... regardless of the form of war employed. In this way, defensive campaigns of exhaustion *and* annihilation can be conducted successfully *against* an opposing force on the operational offensive. Depending upon the negative aims, the defender may never have to assume the operational offensive to achieve victory.

The key to this operational perspective is the acknowledgement of the counter-thrust and counter-attack as part of the defensive form of war. Generally, it is the combination of the successful tactical defensive actions (initial tactical defense and tactical counter-attack) together with the operational counter-thrust that allows for the defender to seize the initiative and achieve decisive results while remaining on the operational defensive.

EXAMPLES OF CAMPAIGNS OF ANNIHILATION ILLUSTRATING CULMINATION

The following illustrations depict some very simple theoretical models for campaigns of annihilation. The models reflect two opposing forces each pursuing a campaign of annihilation and employing available forces in either the operational defense *or* offense. Within the models, neither force changes their operational form of war although the tactical battles conducted may be either offensive or defensive depending upon the force generated and the campaign plan of each side. In essence, the curves represent a qualitative assessment of the

campaigns conducted by each side in terms of gaining and retaining the operational initiative. The curves are smoothed in the examples for clarity. In reality, the curves would be very jagged reflecting large jumps in the combat power ratios based upon the results of the individual battles (See Figure 4-11).

STATISTICAL DESCRIPTION

Since the curves represent the comparative quality of the campaign, the force ratios cited should be considered to include only the combat power at the tactical level. Thus, the combat power ratios on the vertical axis reflect only the ratio of the sum of the tactical combat power available to each operational commander. (See Section IV, Converting Energy to Power, and Figures 4-2 thru 4-4)

The following are the mathematical formulas describing the curves:

TERMS: Sum of total combat power of attacker at t=i; FA_i
Sum of total combat power of defender at t=i; FD_i
Combat Power Ratio variable for attacker at t=i; RA_i
Combat Power Ratio variable for defender at t=i; RD_i
Force Ratio Adjustment factor for attacker at t=i; FRA_i
Force Ratio Adjustment factor for defender at t=i; FRD_i

FORMULAS:

$$RA_o = \frac{FA_o}{FD_o} \qquad RD_o = \frac{FD_o}{FD_o}$$

$$RA_i = FRA_{i-1} - (FRA_i - FRD_i)$$

$$RD_i = FRD_{i-1} - (FRD_i - FRA_i)$$

$$FRA_i = \frac{FA_i - FA_{i-1}}{FA_i} \qquad FRDi = \frac{FD_i - FD_{i-1}}{FD_i}$$

Figure D-1 represents the example where the attacker begins the operational offensive with overwhelming combat power. The defender is unable to attrit the attacker to a point of culmination and thus is unable to seize the operational initiative. The point of culmination is theoretically where the relative combat power of the defender and attacker are equal. In this example, the attacker has an excess amount of combat power represented by ^ P at its lowest comparative advantage. The defensive culminating point is not depicted on the figure but

FIGURE D–1: ATTACKER BEGINS OFFENSIVE WITH SUFFICIENT COMBAT POWER TO AVOID REACHING THE OFFENSIVE CULMINATING POINT.

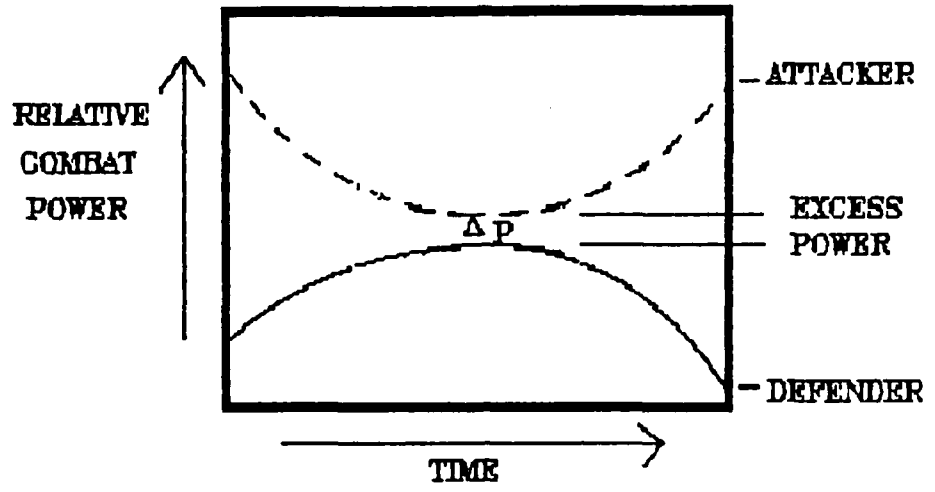
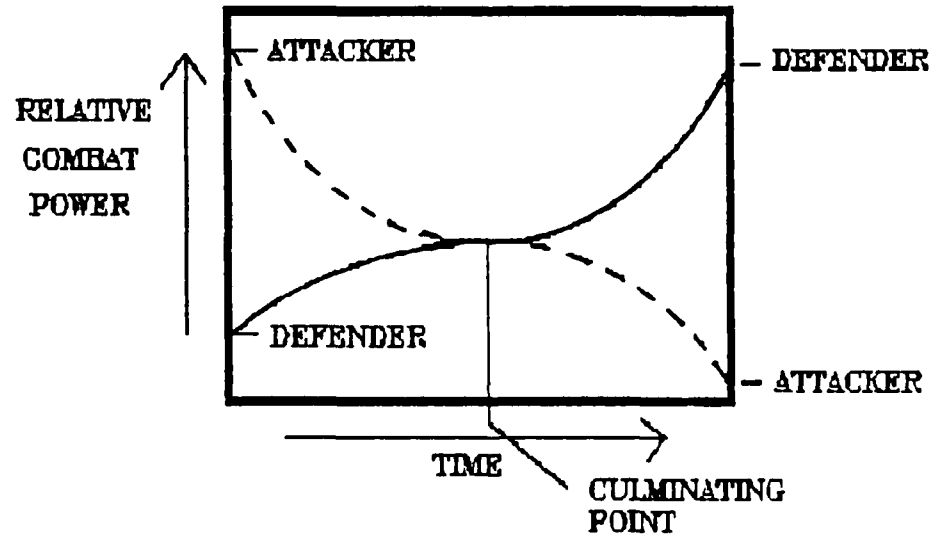


FIGURE D–2: OFFENSIVE CULMINATING POINT IS REACHED BY ATTACKER. DEFENDER CONDUCTS COUNTER–THRUST AND SEIZES THE INITIATIVE.



would be located where the slope of the defender's combat power ratio curve begins its steepest decline thus representing collapse. Two historical examples that may have reflected this occurrence were Germany's initial campaign against Poland in 1939, and the Soviets attack of Finland during the Soviet-Finnish War, 1939-1940.

Figure D-2 depicts an example where the attacker reaches his culminating point and the defender immediately seizes the initiative and conducts a counter-thrust. In this example the attacker anticipates the culminating point exactly. In reality, the culminating point would probably be a *culminating area* reflecting a window of opportunity. Anytime during this window, the defender could achieve success with a counter-thrust. What makes the culminating point a window is the fog of war and human error in perceiving the opportunity. In the graphical example depicted in Figure D-2, however, the offensive culminating point was immediately perceived and exploited by the defender. An historical example of this campaign could be represented by the allied counter-offensive against the Japanese in the South Pacific theater of operations in World War II.

Figure D-3 postulates a campaign where the attacker begins with inferior combat power. In this example, the defender's campaign plan is fatally flawed. Even with overwhelming combat superiority at the tactical level, the operational defender fails to seize the operational initiative and is defeated. The attacker is actually at his offensive culminating point prior to the initiation of the attack and *risks* decisive defeat from the outset. The defender's culminating point is represented in the figure at the crossover point. This is not intended to reflect equality in combat power, but rather the exponential rate of decline representative of collapse at this point. Napoleon's Ulm-Austerlitz campaign may be representative of this type of campaign occurance. Within the definition of offense and defense, Ulm-Austerlitz is considered an offensive campaign conducted as part of a strategic offensive. The offensive campaign had two major battles: the battle of Ulm was a tactical attack, the battle of Austerlitz was a tactical defense.

Figure D-4 reflects an example where the attacker also begins with inferior combat power but the defender seizes the operational initiative and decisively defeats the attacker. A similar historical example may be represented by Napoleon's offensive campaign into Russia in 1812.

The above figures are intended only to illustrate the dynamic nature of campaigns. In each case the figure attempts to show the relationship between tactical combat power and the quality of the campaign plan. Implicit in employing combat power efficiently is the design of the campaign consistent with available combat power, an appreciation for the enemy's capabilities and the requirement to seize the operational initiative whether on operational offensive or defensive.

FIGURE D–3: ATTACKER BEGINS THE OFFENSIVE WITH INFERIOR COMBAT POWER, HOWEVER, THE DEFENDER DOES NOT SEIZE THE INITIATIVE, THE ATTACKER WINS.

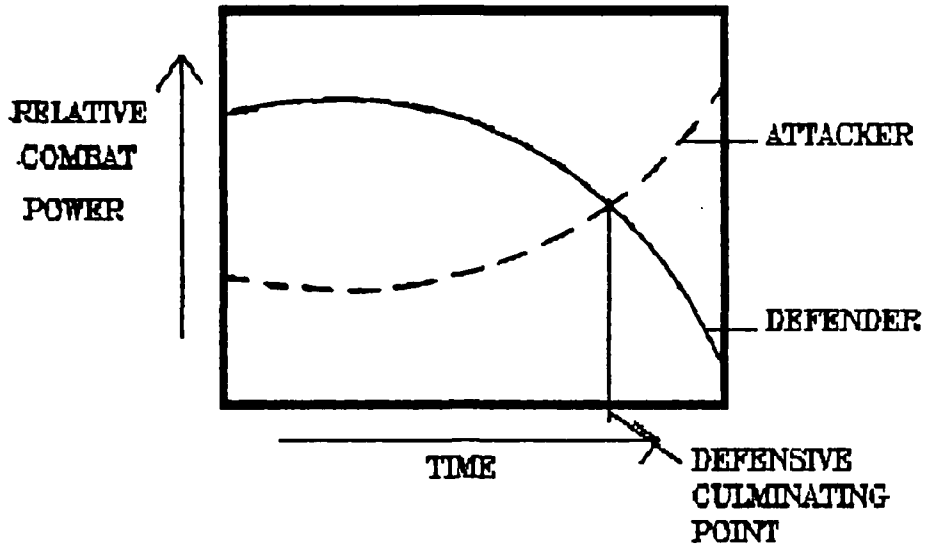
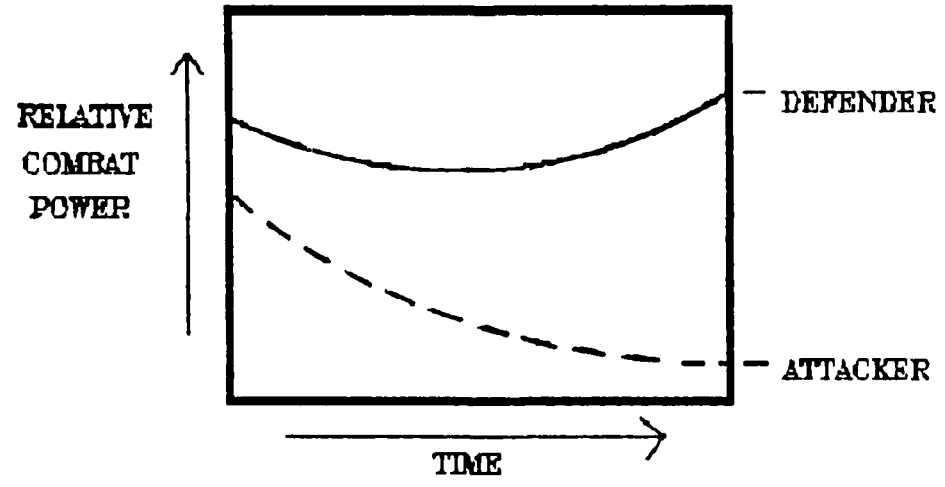


FIGURE D–4: ATTACKER BEGINS THE OFFENSIVE WITH INSUFFICIENT COMBAT POWER, ATTACKER IS AT OPERATIONAL CULMINATING POINT PRIOR TO INITIATING THE OFFENSIVE. DEFENDER CONDUCTS COUNTER–THRUST; DEFENDER SEIZES THE INITIATIVE AND WINS.



Although each figure depicts only simple campaigns of annihilation, the methodology could be expanded to reflect multi-dimensional campaigns with a series of curves reflecting the alternate resumption of the operational offensive and defensive by each opposing side. In these cases, the defensive culminating point would not be reached until the final campaign of the series. The starting force ratio for the intermediate sets of curves would be the force ratios at the end of the preceeding series of battles.

Conceptually, it could be considered as a new campaign when forces transition from the operational offensive to the operational defensive and vice versa. A good historical example is the war in Korea. The transition of UN forces to the operational offensive, signaled by the landing at Inchon, could be considered a separate campaign than the operational defensive conducted south to Pusan. Similarly, the defensive campaign conducted following the intervention by the Chinese could also be considered a separate campaign. From this perspective, part of strategic art is the *sequencing of campaigns* in order to achieve strategic ends.

In summary, the ends, means and ways of war selected determine the overall form of war. The form of war, in turn, affects the operational perspective of the leader and should indicate the general force requirements and battle sequencing that becomes an essential part of the campaign plan. Additionally, the decision to change the form of war from offense to defense, should be based upon a sound understanding of the implications of force requirements and the expected results of the envisioned battles.

APPENDIX E, CENTERS OF GRAVITY AND DECISIVE POINTS IN THE NORMANDY CAMPAIGN

INTRODUCTION

The concepts of centers of gravity and decisive points are illustrated in the Normandy campaign which took place generally between January 1943 to August 1944. It is beyond the scope of this appendix to conduct a detailed campaign analysis of the Allied invasion of France. A summary of many of the salient points of the analysis can be found in William R. Betson's excellent monograph: "Centers of Gravity, Lines of Operations, and the Normandy Campaign."[1] However, I will cover in some detail, the initial phases of the Normandy campaign because these are not discussed in Betson's monograph to any extent.

In using an historical example to illustrate the concepts of centers of gravity and decisive points, it is necessary to determine the perceptions of the two opposing sides. Generally, what both sides select as centers of gravity and decisive points, although not articulated as such, often conflicts with what should have been selected. This inconsistency is part of the conduct of war and serves to adjudicate the comparative quality of the opposing campaign plans. The Normandy campaign reflects the selection of centers of gravity and decisive points within a phased campaign and also illustrates the difference between perception and reality in determining these abstractions.

The requirement to phase a campaign often dictates the selection of multiple sets of centers of gravity and decisive points. When devising a campaign plan, the operational planner must make an initial assessment of ways, means and ends. If the climactic series of battles are dependent upon first establishing preconditions that, in turn, require major operations, then the overall campaign should be phased. Frequently, the required pre-conditions involve the conduct of separate campaigns each with their own respective centers of gravity and decisive points. The Normandy campaign required the establishment of preconditions that necessitated phasing.

The Normandy operation required several phased sevice operations focused sequentially on the sea, air and land. The Allies required command of the sea to successfully build-up units in England and then project that combat power across the English channel to France. Additionally, they required air superiority to successfully conduct an amphibious landing against prepared costal defenses over the course of several days. Finally, to conduct offensive ground operations to expand and then break out of the initial lodgement area, required the build-up of superior air-ground combat power.

The operation consisted of four major phases: (1) the build-up of combat power in England and gaining control of the seas; (2) the gaining of air superiority and cross channel projection of power; (3) the amphibious landing and establishment of a lodgement; (4) and the build-up of combat power in

preparation for the breakout. The first phase was dependent primarily on naval forces, the second phase depended primarily on air forces, and the final two phases depended upon defeating enemy ground forces.

PHASE I, THE CAMPAIGN FOR COMMAND OF THE SEA

Before examining the first phase, it is necessary to look at the overall naval campaign for *command of the sea* leading up to the Normandy operations. The battle for command of the sea began shortly after the commencement of war between the Allies and Germany and continued until the end of the war. Germany's ability to contest the command of the sea resided in her two 31,000-ton battleships, the *Scharnhorst* and *Gneisenau*; two 42,000-ton battleships, the *Tirpitz* and *Bismarck*; three 20,000-ton pocket battleships, the *Deutschland*, the *Admiral Scheer*, and the *Graf Spee*; three heavy cruisers; six light cruisers; numerous destroyers; and 56 submarines.[2] The number of U-boats would grow to more than 300 by May of 1943 while the number of surface combatants would steadily decrease as the war progressed.[3] Opposing the Germans was a formidable Allied Navy. The U.S. alone had over 60 battleships, carriers, and cruisers in commission and 80 more under construction at the time they entered the war.[4] The British also had a fleet which was experienced, professional and powerful.

Faced with the overwhelming combat power of the two Anglo-Saxon powers, the German Navy developed a strategy of "tonnage warfare" in which they hoped to offset their material inferiority. Germany did not dispute the Allied command of the sea by concentrating the few powerful ships she possessed and attacking decisive points in the Allied system. Instead, Germany chose to disperse her scarce assets throughout the theater and conduct commerce raiding. Thus, "instead of conserving these precious heavy units for concentrated attack upon the Allied system itself, German naval strategy persistently squandered them away in isolated packets and upon secondary missions..."[5] Once the heavy units had been destroyed or neutralized, the only offensive or defensive naval units remaining to contest use of the sea in the Normandy campaign were the German U-boats and E-boats. These elements comprised the German center of gravity for the initial phase of the Normandy campaign.

The Allies were thus confronted with a dispersed enemy center of gravity conducting attrition warfare against non-combatant commerce ships. The German submarine fleet, however, still posed a threat to both the build-up of combat power in England and the eventual cross-channel amphibious operation. To counter this threat, the Allies developed an anti-submarine doctrine which would turn the battle of attrition against the German's, and effectively neutralize their Center of Gravity.

To counter the decentralized Wolf-packs, the Allies developed a procedure for centralized control and decentralized and dispersed reaction to German U-boat attacks. In the North

Atlantic, the British and Canadians formed support groups of six to eight destroyers, frigates, or corvettes. These support groups responded on short notice to convoys under attack by the Wolf-packs and, coupled with the regular escort ships, successfully drove the U-boat fleet into operating in the Central Atlantic. The responsiveness of the support groups together with their increased combat effectiveness was primarily due to several technological breakthroughs.[6] These support groups comprised the Allied center of gravity and were employed directly against the German's center of gravity.

The movement of the German Submarine fleet into the Central Atlantic also forced the U.S. to develop a Center of Gravity to defeat the threat. Admiral King brought together all the U.S. antisubmarine intelligence and control facilities under one command and designated it the U.S. Tenth Fleet. All ships present in the Central Atlantic became OPCON to the 10th Fleet upon direction of the 10th Fleet Commander when German U-boat attack necessitated. Additionally, Admiral Ingersoll organized independent antisubmarine Hunter-killer groups to track down and destroy German U-boat Wolf-packs. These groups consisted of an aircraft carrier, 4-6 destroyers and various other combatants and were highly successful in tracking and killing the enemy U-boats. These groups, under control of the 10th Fleet, comprised the Allied center of gravity in the Central Atlantic.

This center of gravity operated against German decisive points. To enable the German U-boats to operate out into the Atlantic, they had to be resupplied with fuel from German U-boat "milch cows." The U.S. antisubmarine warfare focused on these submarines as they were located through decoded radio transmissions. The continued destruction of these refueling submarines forced the Germans to limit the range of their interdiction campaign and eventually made German attacks ineffectual.[7]

Air power also played a significant role in the naval campaign. Land based aircraft operating from Newfoundland, Iceland, Northern Ireland, and southwest England were effective in responding to German U-boat sightings and in destroying the submarines.[8] The bombing of submarine yards and launching bases beginning in late 1943 also degraded the enemy's center of gravity and helped win the battle for the Atlantic.[9] In this case, the Allied naval forces provided the focus for the employment of both the air and sea components of combat power.

The success of the Allies over the Germans can be attributed, in part, to their comparative selection of centers of gravity and corresponding naval strategies. The Allies recognized that command of the sea meant the neutralization of the German's offensive naval capability. They actively pursued and destroyed any and every major surface vessel employed by the Germans in their convoy interdiction operations. The Allies identified the submarines as the center of gravity and attacked decisive points that degraded their capability and effectiveness and resulted in their defeat. Conversely, the German's identified an Allied

vulnerability that had virtually no effect on the naval centers of gravity. In focusing on the starvation and isolation of England, the German naval campaign attempted to win the war by destroying the strategic moral component of energy without winning any battles. They continued with this strategy long after it became apparent that their efforts could not achieve strategic victory. An alternative strategy could have focused the German's scarce resources against decisive points of the Allies, degraded their centers of gravity, and at least contested the command of the sea. The end result could have had a profound adverse psychological and physical impact upon any Allied effort to conduct an amphibious operation across the English channel.

PHASE II, THE ATTAINMENT OF AIR SUPERIORITY

The conduct of the air campaign prior to the Normandy beach amphibious landings was the cause of much controversy and conflicting demands. Air power had to provide security from enemy air attack and protect the ground forces from destruction during the movement and landing phases. It was also expected to keep the enemy's mobile Panzer divisions from attacking and destroying the landing force during the critical lodgement phase. Finally, it was expected to continue strategic bombing to weaken the German's overall war effort and help bring about an early cessation of the war.

Amidst these competing demands, there emerged several plans for employment. The Transportation Plan employed strategic bombing assets against numerous transportation nodes and was intended to both isolate the Normandy beaches and hinder the German war effort. The Oil Plan directed strategic bombing against fourteen synthetic petroleum plants. Again, the intent was to hinder the mobility of the Panzer divisions, this time by denying those forces fuel, and to adversely influence the total German war effort. Additionally, the campaign to ruin the Luftwaffe attacked German airfields and attempted to attrit the Luftwaffe fighter squadrons through air battles over Germany. Finally, a strategic bombing campaign targeted key German facilities and industries in the attempt to destroy the combat capability of the Germans. Central to this later effort was the bombing of V-weapon launching sites along the channel. Following on the heels of these strategic bombing campaigns were the interdiction and landing support fires that were planned in support of the actual amphibious landings.[10]

These competing demands on the air power forced a decision on the priority of air support. General Eisenhower, with the urging of General Spaatz (the commander of the United States Strategic Air Forces in Europe), insisted on "air supremacy as a prerequisite for D-Day."[11] With this as an overriding priority, Eisenhower also opted to execute both the Transportation Plan and Oil Plan, beginning first with the Transportation Plan.

The major Luftwaffe force denying the Allies air superiority were the German fighter squadrons. These were largely composed

of the Messerchmitt Bf 109Es and Bf 109Fs and the modern Focke-Wulf Fw 190s. This fighter air fleet composed the center of gravity of the German forces in the campaign for air superiority. Similarly, the combined bomber-fighter fleets of the Allied forces formed the massive center of gravity which the Germans had to defeat. The Allies' fighters and bombers must be considered together because they both threatened and destroyed the German center of gravity and corresponding decisive points. It was their dual employment that was decisive in winning the air superiority campaign.

The combination of the Oil Plan and the campaign against the Luftwaffe support installations proved decisive during the conduct of the air campaign. The initial strategic bombing in support of the Transportation Plan was ineffectual in both disrupting the transportation network or in drawing the Luftwaffe fighter fleet into pitched air battle against the bomber's fighter escorts. In contrast, the attack of the petroleum plants had a immense impact on the production capability of Germany and also forced the Luftwaffe fighters to defend the facilities against the bombing raids. The Luftwaffe fighter squadrons were forced to redeploy to German airfields and continuously counter the strategic bombing of the petroleum plants. An example of the tremendous impact that these attacks had was reflected in the Luftwaffe fighter losses on 12 May; in one day, the Luftwaffe lost 150-200 fighters against the Eighth Air Force raid on the synthetic petroleum plants.[12]

Similarly, the campaign against the Luftwaffe airfields in France was also decisive. Within 500 kilometers of the Normandy landing sites were around 100 airfields. The Allied air forces, concentrated on making these airfields unusable and also attacked and bombed the Luftwaffe radar installations used to provide early warning and guide Luftwaffe squadrons. The total air superiority campaign in April and May alone, accounted for a loss of over 5,000 Luftwaffe pilots.[13] Additionally, it insured control of the air over the Normandy beachhead that not only provided security for the ground forces but also allowed for the joint defeat of the enemy's center of gravity in Phases III and IV.

The selection of the decisive points by the Allied forces was the critical factor in the air superiority campaign. The Allies could not force the Luftwaffe fighters into combat until they threatened a decisive facility. In fact, the German squadrons allowed many of the Transportation Plan bombing runs to be conducted unimpeded. However, the attack of the petroleum plants forced these squadrons into the air and also caused their redeployment away from the Normandy beachhead. Thus, the selection of these plants proved decisive. In contrast, the German's were unable to attack decisive points that significantly degraded the center of gravity of the Allies. Although, their entire strategy had devolved into depending upon a decisive victory against the expected Allied amphibious landing, the German's continued to employ their strategic bombing against England's populace. Again, their strategy was based upon winning

the war by destroying the opponents will, rather than establishing the pre-conditions for success in the anticipated climactic battle.

PHASES III & IV, THE AIR-GROUND CAMPAIGN

The air-ground campaign conducted in phases III and IV depicts the key relationship between what an operational commander perceives and what actually are the opposing forces centers of gravity and decisive points. The actual disposition of the forces, the effects of deception and the eventual performance of the forces all serve to delineate the differences between perception and reality.

Betson's monograph covers, in detail, the actual Allied landing, the establishment of the beachhead and the initial expansion of the lodgement. However, Betson uses different rationale for identifying the opposing forces centers of gravity. He uses the concept of mass to define the Allies center of gravity and the concept of intentions and expectations to define the German's center of gravity. He argues that the Allied center of gravity in the Normandy landings was the United States air and ground forces. He bases his judgement primarily on the superior reinforcing capability and sustainability of the U.S. forces over those of the British.[14]

On the other hand, Betson identifies the German center of gravity as being the Panzer Divisions. He bases this assessment on both the German commander's, Field Marshal Gerd von Rundstedt, intention to use the panzers to defeat the Allies and the Allies' expectation that the defeat of this force would be decisive.[15] Thus, the determination of the center of gravity for the German's is based primarily upon intentions and expectations. The examination of the Allied center of gravity using this same criteria will yield a different result.

The determination of the Allied center of gravity must also be based upon the perspective of the opposing force's commanders. As indicated in the previous theoretical analysis, the critical question is: What *force* was the *enemy* expecting the Allies to use as their *arm of decision*? This defines what the enemy perceived as the Allies center of gravity. The next question is: What did the Allies intend to use as their *arm of decision* to achieve victory? These two questions solicit conflicting responses that nevertheless define the perceived center of gravity of the Allies from two opposite perspectives.

During Phase III and well into Phase IV the German's perceived that the center of gravity of the Allies was the First United States Army Group commanded by General George S. Patton, Jr. The Allied deception plan depicted Patton as commanding the primary landing force targeted for the Pas de Calais beaches in France. The Germans had strengthened their defenses in this area, had also positioned their Panzer reserves opposite these beaches and prepared their concept to defeat Patton's fictional Army.

Following the Normandy landings, von Rundstedt, continued to hold 18 divisions of his Fifteenth Army in the Pas de Calais through the month of June. The few divisions moved from the Fifteenth were replaced in the Pas de Calais area from divisions brought from Denmark and Norway. Finally, and only at the end of June, did von Rundstedt take from the Fifteenth Army and move two infantry divisions and one panzer division across the Seine against the the Allied lodgement.[16] The German deployment of forces and the actual conduct of battle was based upon the perception that the Allied center of gravity was the fictional First Army Group.

The Allies perceived center of gravity also conflicts with Betson's conclusion. Eisenhower believed that the key to the successful lodgement was the defeat of the German panzer divisions. He was aware that the German's expected the Allied landing in the Pas de Calais area and, in fact, developed an elaborate deception plan to represent that concept. He also knew that the Germans would deploy their Panzer Divisions to facilitate attack against Allied landings in France and against the Pas de Calais beaches in particular. Eisenhower also knew that the British sector contained the high speed avenue of approaches both from and too the east where the preponderence of German panzer forces were deployed (east of the Seine).[17] General Montgomery also intimated the expectation of a major tank battle against the German Panzers "in a knockabout toward Falaise".[18] The enemy disposition of forces, the expected effects of the deception plan, and the terrain all indicated that the decisive air-ground battle to defeat the German center of gravity would be conducted by the British Second Army. Therefore, the Allied perceived center of gravity must be considered as the British Second Army and not the U.S. First Army under General Bradley.

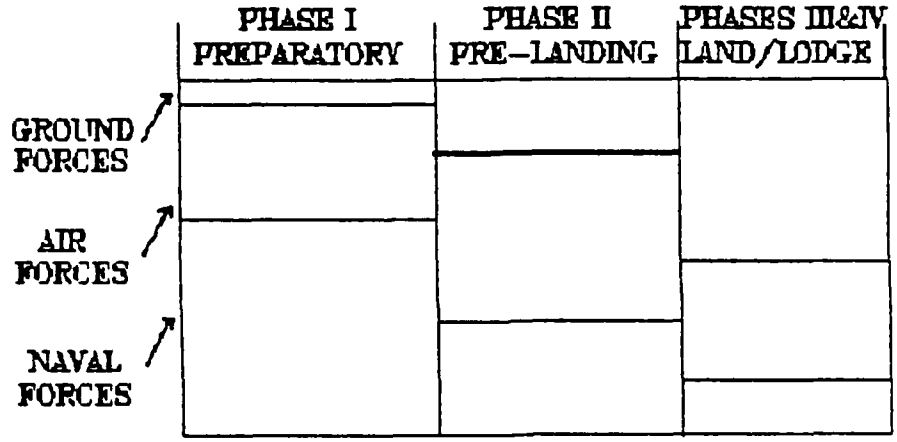
The decisive points selected by each side also reflect their perceptions of the centers of gravity. The decisive points of the Panzer Divisions were the River crossing sites leading to the Normandy beachhead and the defensible terrain beyond the German beach defenses. Allied victory depended upon attaining this defensible terrain before being counterattacked by the German panzer divisions. Similarly, air power attacked the enemy's mobility by interdicting his routes across the rivers and thus prevented his counterattack.

The decisive point of the Allies was clearly the initial beachhead. The employment of the German panzer divisions against Allied forces during the landings would have been decisive. The fact that the German's were deceived into designating the beaches in the Pas de Calais area as the specific decisive point was also critical to the success of the campaign.

CONCLUSIONS

The Normandy operation was a multi-phased campaign that required the conceptualization of separate and distinct centers of gravity. The achievement of the command of the sea and air superiority was critical to the eventual sea-air-ground campaign

FIGURE E-1: MEDIUM OF DECISION IN NORMANDY CAMPAIGN.



CENTERS OF GRAVITY FOR GERMAN FORCES:

PHASE I: GERMAN ATTACK SUBMARINE FLEET

PHASE II: LUFTWAFFE FIGHTER AIR FLEET

PHASE III & IV: GERMAN PANZER DIVISIONS

that established the Allied lodgement in France. It is certain that the operational commanders involved in this multi-phased campaign did not articulate their goals and objectives in terms of centers of gravity and decisive points. However, if they would have, there is reason to believe that the efficiency and effectiveness of the campaign would have improved. Figure E-1 depicts the phased nature of the Normandy operation and represents the dynamic focus of the campaign as it progressed from start to completion.[19] The figure depicts the on-going campaigns on sea, land and air throughout all phases, but also reflects the central focus in the medium of decision. The medium of decision should dictate the main effort of the operational commander and the joint force. The operational commander must subordinate operations by the other services to the service operating in the medium of decision. However, the eventual campaign decision is usually achieved by AirLand forces fighting the final decisive land campaign towards geo-political objectives.

Finally, the perspective of each opposing side is essential in the designation and/or determination of centers of gravity and decisive points. In modern war, it is the intention of the commander to use a force in a decisive manner that gives that force both weight and importance. The ways in which the means are employed greatly influences the value of those means.[20] Similarly, the defeat of an opposing commanders intentions defeats the opposing commander's plan. The defeat of the opposing commander's plan through the exploitation of his expectations, leads to the defeat of the enemy.

ENDNOTES

SECTION I, INTRODUCTION

1. F. T. Banks and W.W. Mendel, "Campaign Planning", Final Draft Report (FOUO), Strategic Studies Institute, U.S. Army War College: Carlisle Barracks, Pennsylvania, 30 Sept 1987, p. x.

2. Ibid. Banks and Mendel's study examined the campaign planning of the major major military commands. They found many differing and convoluted processes being followed by the major headquarters with wide variations in the quality of the headquarter's campaign plans. They concluded that the doctrine for developing campaign plans is severely lacking and that doctrine specifying both the process and product needs to be codified.

3. Hermann Hesse, Siddhartha, New York: Bantam Books Inc., 1974, p. 142.

4. Carl von Clausewitz, On War, Translated by M. Howard and P. Paret, Princeton, N.J.: Princeton University Press, 1976, p. 141.

5. Clausewitz develops his theory of war based upon Newton's physical analogy of F=ma. Clausewitz uses Newton's Force to represent military force, Newton's mass to represent military means and Newton's acceleration to represent will.(David A. Fastabend, "Weighing the Center of Gravity", School of Advanced Military Studies Course IV Essay, Ft. Leavenworth, KS: U.S. Command and General Staff College, undated, p. 5.)

6. The paradigms developed in this monograph are based upon the physical concept of energy. Energy was an unknown concept in Clausewitz's time and there were no formulas in existance that described its effects. However, just as physical science has progressed in its paradigms from Newtonian physics, through quantum physics to Einstein's Relativity, so should the physical analogy describing war progress. The increased mobility, dispersion and lethality of forces on the modern battlefield, the broad spectrum of modern conflicts with its attendant social-political influences, the expansion of the medium of war into air land and sea as well as in the electro-magnetic and nuclear fields all demand that the Newtonian-Clausewitzian war analogy be updated. However, Relativity did not contradict classical physics, but only regarded the old concepts as limiting cases that were familiar to the experiences of original theorists. So should a war paradigm based on energy also include and explain the Clausewitzian-era battles and war. However, the new paradigm should also address the aspects of modern conflict. These should include operations and conflict across the broad spectrum from low intensity to high intensity war. It should also serve to model and describe the phenomenon of war consistent with the modern operational environment and fielded doctrine.

In this regards, this monograph develops several models closely related to modern physical science. For instance, the concept of converting energy into power is similar to simple electrical theory. Likewise, the increase in the value of the *means* based upon the way they are employed can be compared to Relativity. In Einstein's theory of Relativity equation E=mc2, the *mass* of a moving body increases as its motion increases relative to the observer. Although the implications and scope of this analysis far exceeds the intent of this monograph, it is hoped that the ideas forwarded within this paper can encourage a more rigorous and detailed examination of the physical analogies describing war.

SECTION II, THE NATURE OF WAR

1. Julian Lider, On the Nature of War, Farnborough, Hants: Saxon House, 1977, p. 2.

2. In extrapolating the theoretical models to other than nation-state conflicts, "nation" may represent any social-political group, alliance, or coalition that is able to contest the will of an external and separate group through the application of its available means towards desired ends. In this manner, the paradigms can be used to explain Marxist-Lenninist conflicts between classes or internal insurrections.

3. B.H. Liddell Hart, Strategy, New American Library, New York, 1974, p. 322.

4. Clausewitz, On War, p. 89. Clausewitz develops the balance within the trinity of war-the people, the government, and the Army as key to the successful conduct of war.

SECTION III, PREPARATION FOR WAR

1. Barry R. Posen, The Sources of Military Doctrine, Cornell University Press: Ithaca, N.Y., 1986, p. 14.

2. This basic model was outlined by Colonel L.D. Holder, director of SAMS, School of Advanced Military Studies, Fort Leavenworth, KS, 10 August 1986 in a presentation to SAMS students. The one depicted has been modified to highlight the influence of doctrine.

IV. THE ENDS, MEANS AND WAYS OF WAR.

1. Clayton R. Newell, "Balancing the Ends, Ways and Means", Army, August 1986, p. 25.

2. James E. Sikes, Major U.S.A., Paradigm presented to Seminar Group 4 during discussions on the battle of Kursk, School of Advanced Military Studies, Fort Leavenworth, KS, 22 January 1988.

3. Clausewitz, *op. cit.*, p. 137.

4. Col David M. Glantz, Lectures at the School of Advanced Military Studies, Fort Leavenworth, Kansas, 11-14 August 1987. Col Glantz indicated that, when conducting offensive operations, the Soviets try to achieve force ratios in excess of 5-6 to one at the tactical level, at least two to one at the operational level and 1.5 to one at the strategic level. The intent is to economize in some sectors while concentrating in others. The higher the level of war, the smaller the comparative advantage needs to be to be able to concentrate sufficient forces at the point of decision.

5. The overwhelming influence of the moral aspects of war has been articulated by numerous historians, generals and military theorists. Napoleon is said to have stated "In war the moral is to the material as three is to one." Jomini wrote "It is the morale of armies, as well as of nations, more than anything else, which makes victories and their results decisive." Frederick the Great wrote in his Instructions for his Generals, "A battle is lost less through the loss of men than by discouragement." Several great soldiers of World War II also understood the profound influence of moral factors. Sir William Slim in an address to his his officers in 1941 stated: "Morale, only morale, individual morale as a foundation under training and discipline, will bring victory." Field Marshall Montgomery in his Memoirs of Alamein wrote: "The morale of the soldier is the greatest single factor in war..." Finally, B.H. Liddell Hart in his book Defense of the West wrote, "Loss of hope, rather than loss of life, is the factor that really decides wars, battles, and even the smallest combats." (Robert Debs Heinl, Jr., Dictionary of Military and Naval Quotations, Annapolis, Maryland: United States Naval Institute, 1985, p. 196.)

6. The actual mathematical formula representing these relationships can be derived from the Venn diagrams. For instance, the formula for the total physical component of energy at the operational level would be:

$$(M_{ground} \cup M_{naval} \cup M_{air}) = M_{gnd} + M_{nav} + M_{air} - (M_{gnd} \cap M_{nav}) - (M_{gnd} \cap M_{air}) - (M_{air} \cap M_{nav}) + (M_{gnd} \cap M_{nav} \cap M_{air})$$

It is not the intent of this analysis to provide an empirically based formula for the computation of combat power at each level, but rather to provide a conceptual basis from which the related factors can be examined and considered. However the conceptual framework presented in this paper could be used to develop a more rigorous and quantitative approach to combat power comparisons.

7. The efficiency factor is represented as a ratio of the composite value of the related variables of the friendly force (defined as the efficiency coefficent) divided by the efficiency coefficient of the enemy force. Statistically, the related variables could each be represented by a value from 0 to 1.0. The efficiency coefficients for both enemy and friendly forces could be the product of these variables and also have a range

from 0 to 1.0. The ratio of these coefficients would then represent the *comparative* efficiency that each side employs the available combat power.

8. Gordon A. Craig, "Delbruck: The Military Historian", in Makers of Modern Strategy from Machiavelli to the Nuclear Age, Peter Paret, ed., New Jersey: Princeton University Press, 1986, p. 341.

9. The defense as the stronger form of war has been proposed by several theorists and debated by many others. It is beyond the scope of this paper to develop an in-depth defense of this proposition. However, the combat models developed by the army and T.N. Depuy, do give the statistical weight to forces in the defense. Also the Soviets require norms reflecting superior force ratios at all level of war to conduct successful offensive operations; inferring the strength of the defense. Given the definition of the strategic defensive, it would require additional forces to secure LOCs and increased CSS to support those forces as operations extended into the territory sympathetic to the enemy. These should be considered in the war energy formula when comparing combat power for each proposed course of action. Perhaps Clausewitz argues the point most directly in Book Six, Chapter One in On War, when he states that if the defense was not the stronger form of war, no one would ever use it for it would have no utility. "If the attack were the stronger form, there would be no case for using the defensive, since its purpose is only passive. No one would want to do anything but attack: defense would be pointless." (p. 359) Additionally, and depending upon the situation, there are real moral advantages that are accrued to either the defender or the attacker at each level of war. Clearly, the defense is not stronger if it is improperly conducted nor is the attack weaker if it is a product of a comparatively exceptional concept. Thus, the efficiency of employing available war energy significantly influences comparative combat power (as indicated in the previous analysis). However, when designing the ways at all levels, the commander must assess required combat power that will be needed to achieve success. In this regard, theoretical norms of comparative combat power can provide the basis from which the commander can assess risk and uncertainty, and if required, develop the ways that will increase his combat power while usually increasing both risk and uncertainty. See Appendix D for a more complete treatment of the two forms of war.

10. Letter, ATSH-CD-CSO-S, USAIS, 8 April 1980, subject: Data Request for Light Division 86 Study. This letter contained a study of attrition percentages based upon historical force ratios in marine corps infantry dismounted engagements. The curves depicted in Figure 4-7 (the tactical level) are representative of the curves derived in the letter. The curves presented in Figures 4-6 and 4-5 are postulated for the operational and strategic levels based upon intuition and Soviet norms. The nature of attrition as being an exponential function is also proposed by James J. Schneider in "Theoretical Paper No. 1: The Exponential Decay of Armies in Battle", Ft. Leavenworth, KS: U.S.

Army Combined Operations Research Activity, 1985, pp. 115-126. The purpose of presenting these curves is not to provide precise data, but only to present an analytical framework for examining comparative attrition rates based upon the combat power ratios.

11. Quality strategic guidance is essential to the successful practice of operational art. In fact, many definitions describe a campaign as being one that has as its goal "strategic objectives". However, there is no reference that adequately defines what is meant by "strategic objectives" or what are the elements or characteristics of quality strategic guidance. Is it strategic guidance or objectives if it comes from a strategic mouth? I think not! I would assume that strategic guidance would have definite characteristics in regards to space, time, scope and the degree of latitude that operational level commander's can exercise initiative. Possibly, it could define the theaters of operation or theater of war and the respective end state within each. It could be characterized as allowing operational level commanders the freedom to select the desired military effect on the enemy with the corresponding military objectives and methods. I would suggest that complete strategic guidance would include information on the ends, ways and means of the strategic concept. The *ends* desired should be defined in terms of purpose, goals, and objectives and the political effects desired. The *ways* selected should outline priorities, responsibilities, and timing. The *means* should identify the available resources, command and control chain of command and relationships and the allocated spatial areas of responsibilities. Finally, strategic guidance should specify the constraints and restraints imposed upon the operational commander <u>together</u> with the rationale and assumptions upon which the these were based.

12. Brian I. Fugate, <u>Operation Barbarossa</u>, Novato, Calif.: Presidio press, 1984, p.59 as quoted by John F. Mehan III, "The Operational Trilogy", <u>Parameters</u>, Vol XVI, No. 3, Autumn 1986, p. 14.

13. The controversy stems from the convoluted and distorted treatment of the center of gravity by FM 100-5. FM 100-5 mixes the center of gravity (a measure of strength) with decisive points (a measure of weakness). This paper will treat the center of gravity in the Clausewitzian sense as argued by LTC (P) Lawrence L. Izzo and James J. Schneider in their paper "Clausewitz's Elusive Center of Gravity", <u>Parameters</u>, September, 1987, pp. 45-52, and the recent article by Izzo titled "The Center of Gravity is Not an Achilles Heel", <u>Military Review</u>, January 1988, pp. 72-77. They indicate that the center of gravity is represented by a concentration of combat power. As Clausewitz states, "A center of gravity is always found where the mass is concentrated most densely. It represents the most effective target for a blow; furthermore, the heaviest blow is that struck by the center of gravity",(Clausewitz, *op. cit.*, p.485).

14. FM 100-5 defines the culminating point as being "a point where the strength of the attacker no longer significantly exceeds that of the defender, and beyond which continued offensive operations therefore risk overextension, counterattack, and defeat."(p. 181). This parallels closely Clausewitz's concept as put forward in his book On War. However, FM 100-5 does not discuss either the culminating point of the defense nor the culminating point of victory. The former will be developed in the discussion of the offensive culminating point, the later is developed in Clausewitz's On War, and is left to the interest of the reader.

15. Ibid, p. 181.

16. This is an important distinction. Clausewitz considers the counterattack as part of the defense in his treatment of battles and engagements. However, FM 100-5 seems to infer that the defender goes "over to the offense when it (culminating point) arrives." Within the definition of offense, this would require a significant combat power advantage over the previous attacker by the defender that appears to be inconsistent with the concept of the defender exploiting an attacker reaching his offensive culminating point. This same distinction has eluded historians who have attempted to compile statistics on casualty rates based upon defender:attacker ratios. The range of ratios and rates has been significant.(See Robert McQuie, "Battle Outcomes: Casualty Rates As a Measure Of Defeat", Army, November 1987, pp. 31-34.) The failure to identify consistent trends is probably due to both this lack of distinction *and* the failure to include moral as well as physical and comparative efficiency factors in the combat power calculations. See Appendix D for a more complete treatment of the definitions of attack and defense.

17. James Schneider, "Theoretical Paper No. 1," *op. cit.*, pp. 94-109.

18. McQuie, *op. cit.*, p. 33.

19. Using the formulas developed in Appendix B, the defensive culminating point could be postulated based upon a certain rate of deterioration in the combat ratio curves presented. For instance, it could be when $\frac{dRD}{dT} > 2.0$

20. FM 100-5, *op. cit.*, p. 15.

21. In actual practice the development of a campaign plan is not an independent nor straight forward effort. Especially in coalition warfare, the development of a campaign plan that projects a series of battles from the inception of hostilities to their culmination is rare. This is due, in part, to differing political goals and objectives of the various allies involved in the campaign. In many cases, these interests dictate a series battles along divergent axis. Thus, the only agreement that can usually be made is on the most immediate battle where the diverging interests difference in objectives is still relatively

small. In this manner, the coalition progresses from battle to battle with decisions achieved through compromise, consensus and concordance. This obviates the development of a comprehensive and complete campaign plan. Similarly, the political sensitivity of the waring nation populace to the development of a political end state consistent with the employment of military force may also constrain the development of a campaign plan beyond the first battle. Finally, the joint nature of the operational level of war, with its unique chains of authority through each representative's respective component service, frequently requires the same compromise and consensus typical of coalition warfare. The sum total of these influences normally results in a campaign plan that lacks boldness and audacity and/or projects only one or two battles in advance. In modern warfare, the successful operational commander must sell his campaign to both his superiors and subordinate coalition or component commanders.

22. Heinl, *op. cit.*, p. 239.

23. FM 100-5, *op. cit.*, p. 16.

24. This model for the decision cycle and its relationship to agility was constructed from a similar paradigm developed by Anthony M. Coroalles explained to the author in an informal discussion during a School of Advanced Military Studies (SAMS) Southwest Asia Exercise (SWAEX), 9 December 1987.

25. See Field Marshall Viscount William J. Slims book, Defeat into Victory, London: Papermac, 1986 and Major Don T. Riley's monograph on "The Evolution of Operational Art--The reconquest of Burma, 1943-1945," School of Advanced Military Studies, Ft. Leavenworth, KS: U.S. Command and General Staff College, 29 May 1987.

26. See Douglas W. Craft, "Operational Art in the Western Desert 1940-43", ASOF Monograph, School of Advanced Military Studies, Ft. Leavenworth, KS: U.S. Command and General Staff College, May 1987.

APPENDIX A, A THEORETICAL MODEL DESCRIBING THE DYNAMICS OF WAR

1. Clausewitz, *op. cit.*, p. 136-41. These aspects of armed conflict parallel those developed by Clausewitz in book two.

APPENDIX B, DOCTRINE AT THE LEVELS OF WAR AND LEVELS OF CONFLICT

1. John F. Meehan III, "Operational Trilogy", Parameters, Vol XVI, No. 3, Autumn 1986, p. 12.

2. These proposed divisions vary considerably from those specified or implied in the current definitions of the levels of conflict. US Army Training and Doctrine Command (TRADOC) Pamphlet 525-44, US Army Operational Concept for Low-Intensity Conflict, US Army Training and Doctrine Command, Fort Monroe, VA., 18 October 1985, p. 2 defines low-intensity combat. A

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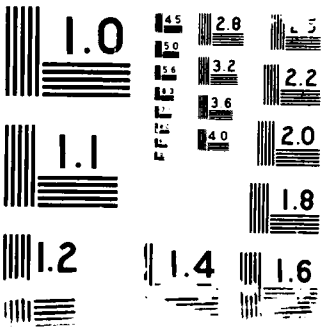
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dated definition of low-intensity conflict and the definitions of mid and high intensity conflict can be found in Field Manual (FM) 100-20, Low-Intensity Conflict, Department of the Army, Washington, D.C., 16 January 1981, p14. These definitions address primarily the military means employed in combat. Only the new definition of low intensity conflict (Pam 525-44) describes the ends and operational environment associated with the level of war. My analysis examines the levels of conflict from a national perspective and does not attempt to analyze the sufficiency or applicability of the existing definitions.

3. LTC Mitchell M. Zais, in his article "LIC: Matching Missions and Forces", Military Review, August 1986, pp. 79,89-99 provides an excellent description of low intensity conflict by detailing the means and ends associated with the various operational environments from an Army perspective. However, his discussion does not take into consideration that portion of the conflict which will be accomplished by other national agencies nor other military services. Thus, his force matching for the various low intensity operational environments may be redundant, inadequate, or counter-productive when viewed from a national strategic or unified military perspective. Effective force alignment depends upon a unified national strategy which integrates all national agencies in a coordinated effort towards well-defined national objectives.

4. The current international situation reflects the preponderance of power in two nation-states: USA and USSR. Except in very critical third world nation-states where these countries vital interests are at stake, the balance of power is affected very little by losses in influence in other third world countries. Thus, the trend is for the escalation of the conflict in these peripheral nations through support of the two superpowers because of the small risk associated with failure. Conversely, the deterrent influence of nuclear weapons and their associated destruction drives the level of conflict away from the high end of the spectrum. Thus, the dynamics of modern conflict has pressured the conflict towards the center of the spectrum once commenced.

APPENDIX C, THREE MODELS OF COMBAT POWER USED BY DECISION MAKERS

1. Student Text 100-9, The Command Estimate, Fort Leavenworth, Kansas: U.S. Army Command and General Staff College, July 1987, pp. 4-7 thru 5-19.

2. Colonel Huba Wass de Czege, U.S.A., "Understanding and Developing Combat Power", Available through the School of Advanced Military Studies, U.S. Army Command and General Staff College, Ft. Leavenworth, Kansas, 10 February 1984, pp. 8-15.

3. Colonel Trevor N. Dupuy, U.S. Army Retired, Numbers, Predictions & War, Fairfax, Virginia: Hero Books, 1985, pp. 32-40.

4. Ibid, p. 39.

5. Ibid, p. 42.

APPENDIX D, OFFENSE, DEFENSE, COUNTER-ACTIONS, AND CULMINATION

1. Carl von Clausewitz, On War, p. 357.

2. The distinction between offense and defense is one which frequently eludes historians and analysts alike. Statistical analyses have been conducted combining the statistics for attacks and counter-attacks. The inherent strength of the defense has been refuted by historians using defensive counteractions as their basis of argument instead of offensive actions. The first step in conducting a comparative analysis of two forces is to first determine which is on the strategic offense or defense, which is on the operational offense or defense and which is on the tactical offense or defense. The determination at each level is by no means a simple one, however, by examining the ways, means and ends in terms of time and space and intentions and expectations, one can simplify the process to a degree.

3. FM 100-5, *op. cit.*, p. 15.

4. Proposed by Mark J. Redlinger in group discussion on the Peninsula Campaign, 1810-1811, Seminar 4, School of Advanced Military Studies, Fort Leavenworth, KS, 5 November 1987.

APPENDIX E, CENTERS OF GRAVITY AND DECISIVE POINTS IN THE NORMANDY CAMPAIGN.

1. William R. Betson, Major USA, "Centers of Gravity, Lines of Operations, and the Normandy Campaign", monograph for the School of Advanced Military Studies, Ft. Leavenworth, KS: U.S. Army Command and General Staff College, 3 June 1987.

2. E.B. Potter, ed., Sea Power, A Navy History, 2d Edition, Annapolis, Maryland: Naval Institute Press, 1981, p. 257.

3. Ibid, p. 266.

4. Ibid, p. 235.

5. Herbert Rosinski, The Development of Naval Thought, Newport, Rhode Island: Naval War College Press, 1977, pp. 93-95.

6. Potter, *op. cit.*, p. 267, The British had developed a crude computer by which the German cipher was broken and thus knew the German submarines intentions. They had also developed a high frequency radio direction finder that allowed the submarines to be pinpointed. Finally, the allies had perfected a micro-wave radar that the Germans could not detect and had also developed

two devices, the hedgehog and squid, which fired mortar rounds and depth charges ahead of the ship. These improvements drastically improved the support groups resposiveness and lethality and helped turn the tide against the U-boats.

7. Ibid, pp. 267-268.

8. Ibid. The bombers of the RAF Costal Command, operating from southwest England, sank 7 U-boats during May of 1943. The week of 28 July, 1943, 9 U-boats in six days were sunk in the Biscay area.

9. Russell F. Weigley, Eisenhower's Lieutenants, Bloomington, Indiana: Indiana University Press, 1981, p. 57.

10. Ibid, pp. 56-70.

11. Ibid, p. 61.

12. Ibid, p. 69.

13. Ibid

14. Betson, *op. cit.*, p. 17.

15. Ibid, p. 15.

16. Weigley, *op. cit.*, p.112.

17. Ibid, p. 50.

18. Ibid, p. 51.

19. This paradigm was adapted from a similar diagram used by LTG John H. Cushman, USA Retired, to explain the command and control of joint forces. I have applied the diagram to the concept of defining a center of gravity within the medium of choice in a phased campaign. Presentation to the School of the Advanced Military Studies, Ft. Leavenworth, KS: U.S. Command and General Staff College, 4 December 1987.

20. This phenomenon resembles that proposed by Einstein in his Theory of Relativity. Classical Newtonian physics asserted that the mass of any body is a fixed property. However, Einstein's Relativity asserts that the mass of a moving body increases with the velocity relative to an observer. In this analogy, the mass of a force package increases with the *intentions* of the employing commander. Its overall value depends upon the relative perspective of the two opposing commanders and its role within the framework of their operational plans.

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